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**RECORD OF DECISION AMENDMENT
OPERABLE UNIT 4,
ENVIRONMENTAL RESTORATION PROGRAM
SITE FIRE TRAINING AREA 8 (FT-08) SOIL
ACC 4-BASE PBC**

**MOUNTAIN HOME AIR FORCE BASE,
IDAHO**



August 2009



USEPA SF



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**DRAFT FINAL
RECORD OF DECISION AMENDMENT
OPERABLE UNIT 4, ENVIRONMENTAL RESTORATION PROGRAM SITE
FIRE TRAINING AREA 8 (FT-08) SOIL
ACC 4-BASE PBC
MOUNTAIN HOME AIR FORCE BASE, IDAHO
August 18, 2009**

Prepared for:



United States Air Combat Command



Mountain Home Air Force Base

And



Air Force Center for Engineering and the Environment
Contract FA8903-04-D-8679, Delivery Order No. 0053

Prepared by:

URS

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with support from

RMC
CONSULTANTS
INCORPORATED

TABLE OF CONTENTS

Section 1	Declaration	1-1
1.1	Site Name and Location.....	1-1
1.2	Statement of Basis and Purpose.....	1-1
1.3	Assessment of the Site	1-1
1.4	Description of the Amended Remedy	1-1
1.5	Statutory Determination.....	1-2
1.6	Data Certification Checklist.....	1-2
1.7	Authorizing Signatures	1-3
 Section 2	 Decision Summary.....	 2-1
2.1	Site Name, Location, and Description	2-1
2.2	Site History	2-1
2.3	Community Participation	2-6
2.4	Scope and Role of Operable Units and Response Action.....	2-7
2.5	Summary of Site Characteristics.....	2-7
2.5.1	Site Overview.....	2-7
2.5.2	Conceptual Site Model.....	2-8
2.5.3	Sampling Strategy	2-8
2.5.4	Nature and Extent of Contamination	2-10
2.5.5	Potential Routes of Migration.....	2-10
2.6	Current and Potential Future Site Land and Resource Uses	2-11
2.7	Summary of Site Risks.....	2-11
2.7.1	Baseline Risk Assessment Summary	2-12
2.7.2	Ecological Risk Assessment Summary.....	2-16
2.8	Remedial Action Objectives	2-16
2.9	Basis for Amending the Selected Remedy.....	2-17
2.9.1	Original Selected Remedy	2-17
2.9.2	Amended Remedy.....	2-18
2.9.3	Common Elements and Distinguishing Features	2-19
2.9.4	Expected Outcomes of Each Remedy	2-19
2.10	Comparative Analysis of Alternatives	2-19
2.10.1	Threshold Criteria	2-20
2.10.2	Primary Balancing Criteria	2-20
2.10.3	Modifying Criteria	2-22
2.11	Principal Threat Waste.....	2-22
2.12	Summary of the Rationale for the Amended Remedy	2-22
2.13	Statutory Determinations	2-23
2.13.1	Protection of Human Health and the Environment.....	2-23
2.13.2	Compliance with Applicable or Relevant and Appropriate Requirements	2-23
2.13.3	Cost Effectiveness.....	2-23
2.13.4	Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable.....	2-24

TABLE OF CONTENTS

	2.13.5 Preference for Treatment as a Principal Element	2-24
	2.13.6 Five-Year Review Requirements.....	2-24
	2.14 Documentation of Significant Changes	2-24
Section 3	Responsiveness Summary	3-1
Section 4	References.....	4-1

List of Tables

Table 2-1	Investigations/Regulatory Actions
Table 2-2	Current Risk by Pathway
Table 2-3	Risk-Based Cleanup Levels
Table 2-4	Cost Estimate Summary for the Amended Remedy

List of Figures

Figure 1-1	Regional Location Map
Figure 2-1	Site Location Map
Figure 2-2	Site Vicinity Map
Figure 2-3	Conceptual Site Model
Figure 2-4	Soil and Soil Gas Analytical Results Summary
Figure 2-5	Groundwater and Bedrock Vapor Analytical Results Summary
Figure 2-6	Potential Routes of Migration
Figure 2-7	Soil Vapor Extraction System Configuration

List of Appendices

Appendix A	Risk Tables
Appendix B	ARARs

TABLE OF CONTENTS

List of Acronyms and Abbreviations

AAC	acceptable ambient concentrations
ACGIH	American Conference of Governmental Industrial Hygienists
AFB	Air Force Base
ARAR	applicable or relevant and appropriate requirements
BACT	best available control technologies
BEW	bedrock extraction well
bgs	below ground surface
BRA	Baseline Risk Assessment
BTEX	benzene, toluene, ethylbenzene, and xylenes
Cal EPA	California Environmental Protection Agency
CDI	Chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CNS	central nervous system
COC	chemical of concern
COPC	chemical of potential concern
CSM	conceptual site model
CTE	central tendency exposure
DEQ	Idaho Department of Environmental Quality
EPA	United States Environmental Protection Agency
EPC	exposure point concentration
ERP	Environmental Restoration Program
FEC	Foothill Engineering Consultants, Inc.
FFA	Federal Facility Agreement
FS	Feasibility Study
FT-08	Fire Training Area 8
HEAST	Health Effects Assessment Summary Tables
HI	Hazard Index
HQ	Hazard Quotient
ID	Idaho
IDAPA	Idaho Administrative Procedures Act
IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
LTM	long-term monitoring
LUC	land use control

TABLE OF CONTENTS

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µg/m ³	micrograms per cubic meter
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
mg/kg-day	milligrams per kilogram per day
mg/L	milligrams per liter
MSSL	Medium Specific Screening Level
MTCA	Model Toxics Control Act
NAAQS	National Ambient Air Quality Standards
NCEA	National Center for Environmental Assessment
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NYS DOH	New York State Department of Health
O&M	operations and maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PPRTV	Provisional Peer Reviewed Toxicity Value
PRG	preliminary remediation goal
RfD	reference dose
RAGS	Risk Assessments Guidance for Superfund
RAO	Remedial Action Objective
RCC	Resources Conservation Company
RI	Remedial Investigation
RMC	RMC Consultants, Inc.
RME	reasonable maximum exposure
ROD	Record of Decision
RSL	Regional Screening Level
SF	slope factor
SI	Site Investigation
SMCL	secondary maximum contaminant level
SVE	soil vapor extraction
SVOC	semivolatile organic compound
TBC	To Be Considered
TCE	trichloroethene
TLV	threshold limit value
TMV	toxicity, mobility, or volume
TOC	total organic carbon

TABLE OF CONTENTS

TOX	total organic halogens
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
URF	unit risk factor
URS	URS Group, Inc.
U.S.	United States
USACE	U.S. Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USFWS	United States Fish and Wildlife Service
UU/UE	unlimited use/unrestricted exposure
VE	vapor extraction
VOC	volatile organic compound
WCC	Woodward-Clyde Consultants

TABLE OF CONTENTS

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1.1 SITE NAME AND LOCATION

Operable Unit 4 (OU-4), Environmental Restoration Program (ERP) Site Fire Training Area 8 (FT-08)

Mountain Home Air Force Base (AFB), Idaho

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Number ID3572124557

1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) Amendment presents the amended remedy at OU-4, ERP Site FT-08, Mountain Home AFB located near Mountain Home, Idaho (Figure 1-1). The determination has been made in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on information contained in and will become part of the Administrative Record file for ERP Site FT-08 pursuant to the NCP at Chapter 40 Code of Federal Regulations (CFR) Section 300.825(a)(2).

The United States Air Force (USAF) is the lead agency and provides funding for site cleanup at Mountain Home AFB. The Air Force and United States (U.S.) Environmental Protection Agency (EPA) Region 10 co-selected the amended remedy. The Idaho Department of Environmental Quality (DEQ) concurs with the amended remedy. Pursuant to CERCLA Section 117 (42 United States Code [USC] Section 9617) and the NCP at 40 CFR 300.435(c)(2)(ii), this document amends the ROD for OU-4 signed by the Air Force on June 16, 1992.

1.3 ASSESSMENT OF THE SITE

Previous investigations have identified a variety of petroleum-based and solvent-based chemical compounds in soil and soil gas at ERP Site FT-08 at concentrations posing potential unacceptable human health risks. The response action selected in this ROD Amendment is considered necessary to protect public health and welfare or the environment from actual or threatened releases of hazardous substances into the environment.

1.4 DESCRIPTION OF THE AMENDED REMEDY

OU-4 is one of six ERP OUs under CERCLA at Mountain Home AFB, and is specific to soil at ERP Site FT-08. The fractured basalt vadose zone bedrock and regional groundwater are not part of OU-4 and will be addressed separately on an installation-wide basis as part of OU-3, the Basewide groundwater OU. However, these media are discussed in the ROD Amendment since they pertain to ERP Site FT-08. There is no surface water, sediment, or perched groundwater at ERP Site FT-08. The remedy selected for ERP Site FT-08 soil (OU-4) in 1992 was No Action.

The amended remedy for OU-4 addresses the medium of concern (soil) as identified in previous investigations, and comprises the final remedial action for ERP Site FT-08.

The amended remedy for OU-4, ERP Site FT-08, is soil vapor extraction (SVE). The major components of the amended remedy include:

- Apply a vacuum to vadose zone overburden soils to induce the controlled flow of air in the soil and remove volatile contaminants from the soil until residual soil and soil gas contaminant concentrations are reduced to the unlimited use/unrestricted exposure (UU/UE) cleanup levels discussed in Section 2.8.
- Complete vapor effluent sampling and soil and soil gas sampling.
- Conduct operations and maintenance (O&M) activities until cleanup levels are met. Achievement of cleanup levels will be documented with sampling results and FFA team concurrence before the system is turned off or dismantled.
- Complete five-year reviews, as needed, and dismantle system.

The Air Force is responsible for and will implement, operate, maintain, monitor, and review the amended remedy in accordance with CERCLA and the NCP to ensure protection of human health and the environment.

1.5 STATUTORY DETERMINATION

The amended remedy is protective of human health and the environment, complies with federal and state regulations that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. Neither the amended remedy nor the original proposed remedy satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume [TMV] of hazardous substances, pollutants, or contaminants as a principal element through treatment). However, the amended remedy reduces the potential for human exposure to ERP Site FT-08 soil contaminants through physical removal of contaminants from the soil and soil gas.

Five-year reviews will be required for ERP Site FT-08 until the cleanup levels are met.

1.6 DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary (Section 2) of this ROD Amendment. Additional information can also be found in the Administrative Record files for ERP Site FT-08.

- Chemicals of concern (COCs) and their respective concentrations (Section 2.7 and associated tables)
- Baseline risk to human health represented by the COCs (Section 2.7)

SECTION ONE

Declaration

- Cleanup levels established for COCs and the basis for these levels (Section 2.8)
- How principal threats are addressed (Section 2.11)
- Current and reasonably anticipated future land use assumptions used in the risk assessment (Section 2.6)
- Potential land use that will be available at ERP Site FT-08 as a result of the amended remedy (Section 2.9.4)
- Estimated capital, annual O&M, and total present value costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 2.9.2 and associated table)
- Key factors that led to selecting the amended remedy (Section 2.9)

1.7 AUTHORIZING SIGNATURES

Name
Installation Commander
USAF – Mountain Home Air Force Base

Date

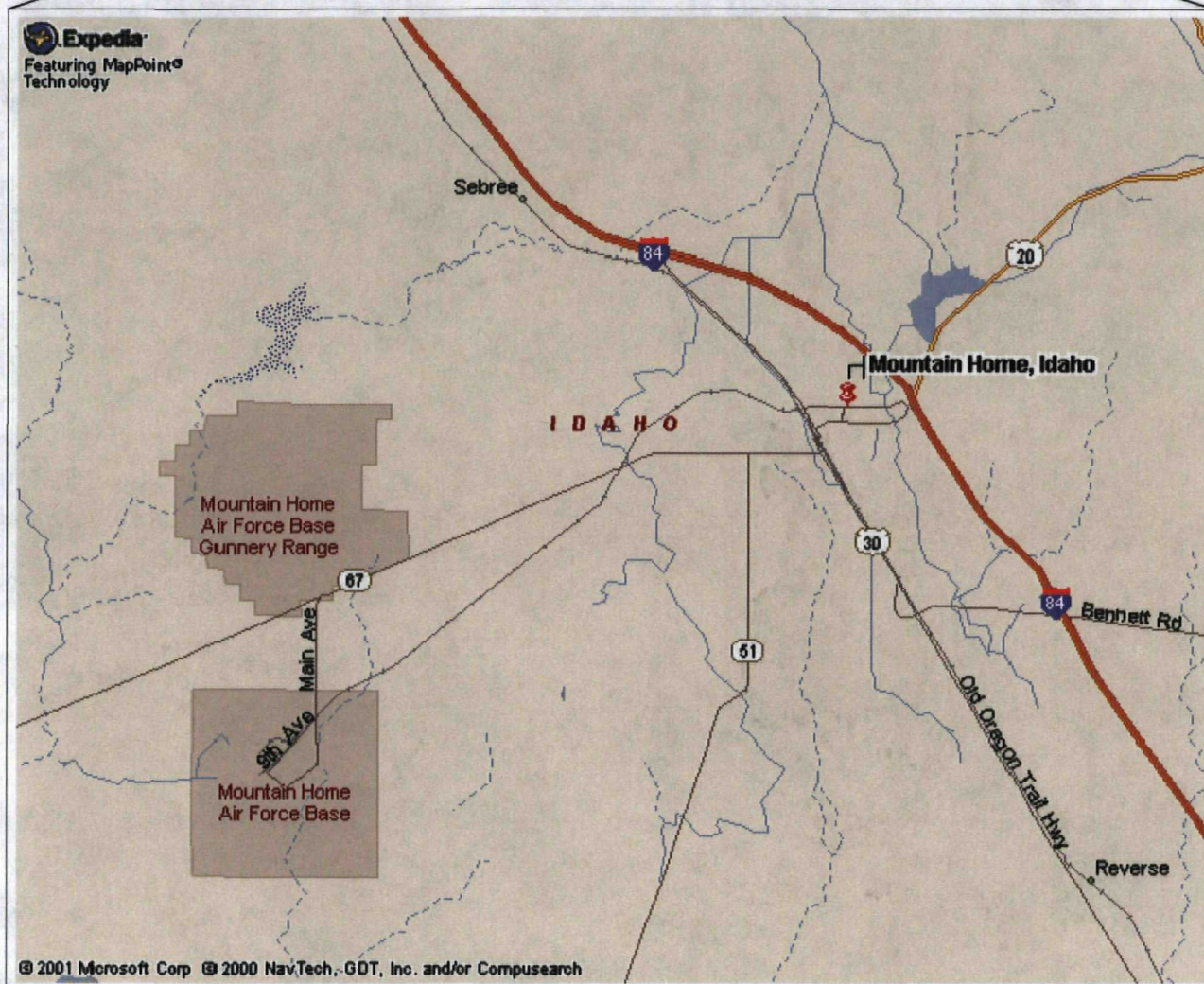
Name
Acting Director, Office of Environmental Cleanup
EPA (Region 10)

Date

Name
Title
DEQ

Date

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June 10, 2009 2:28:29 p.m.
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REGIONAL LOCATION MAP
FT-08 ROD AMENDMENT
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: DPG	DATE: 06/09/09	PROJECT NO. 16169962	FIG. NO. 1-1
CHK'D. BY: SEM	DATE: 06/09/09		

2.1 SITE NAME, LOCATION, AND DESCRIPTION

This ROD Amendment presents the Air Force's amended remedy for ERP Site FT-08 at Mountain Home AFB, which is located on 5,800 acres in Elmore County, Idaho, approximately 10 miles southwest of the city of Mountain Home, Idaho (Figure 1-1). The Base was established in 1943 as Mountain Home AFB and was a training base for several bombardment groups during World War II. During the 1950s the 9th Bombardment Wing, various air re-supply and communications wings, psychological warfare, covert operations, and unconventional warfare groups were stationed at the Base. In the 1960s the 569th Strategic Missile Squadron and the 67th Tactical Reconnaissance Wing were resident at the Base. From 1970 to 2002 various tactical and composite air wings were stationed at the Base. From 2002 to the present the 366th Fighter Wing with F-16C, F-15E and F-15C and Air Control Squadron have been stationed at the Base. Currently, the wing operates only the F-15E aircraft.

Mountain Home AFB was added to the National Priorities List (NPL) in August 1990. The CERCLIS number for Mountain Home AFB is ID3572124557. The Air Force is the lead agency, and EPA is the lead regulatory agency with additional support from DEQ for CERCLA activities at Mountain Home AFB. Funds required for remediation originate from the Air Force Environmental Restoration Account. ← FFA

ERP Site FT-08 is located in the southeast portion of the Base, near the main northwest-southeast runway, southwest of the current fire training area (Figures 2-1 and 2-2). ERP Site FT-08 was the Base Fire training area from 1962 to 1986. Aviation gasoline was used from 1962 through 1975, and jet fuel (with lesser quantities of waste oil and solvents) from Base shops were used from 1976 through 1986. These materials were reportedly poured onto a mock aircraft and ignited for fire training exercises. A typical training exercise involved 300 to 500 gallons of combustible material.

2.2 SITE HISTORY

The following subsections provide summaries of the investigations that have been completed to address soil at ERP Site FT-08. While summaries also describe activities associated with the bedrock vadose zone and groundwater at ERP Site FT-08, these media are addressed separately as part of OU-3. No surface water, sediment, or perched groundwater is present at ERP Site FT-08. There have been no CERCLA enforcement activities at Mountain Home AFB.

Installation Restoration Program Phase II, Stage I Study (Dames and Moore 1986)

An Installation Restoration Program (IRP) (now called the ERP) Phase II, Stage I study was completed in 1986, which included drilling three soil borings and collecting six soil samples. Chemical analysis indicated a wide variety of contaminants (total organic halogens [TOX], oil and grease, and lead) found in unpredictable, dispersed patterns.

IRP Phase IV-A Study (Resources Conservation Company [RCC] 1989)

An IRP Phase IV-A study was completed in 1986 and 1988. Eleven borings were drilled and soil sampling and analysis was completed for volatile organic compounds (VOCs), total recoverable petroleum hydrocarbons (TRPH), and lead. TRPH, benzene, toluene, ethylbenzene, and xylenes (BTEX), and trichloroethene (TCE) were all detected at elevated concentrations.

A complete description of the previous environmental investigations and regulatory actions for all ERP sites, including ERP Site FT-08, has been provided in Tables 2-1 and 2-2 in the Final 2006 Five-Year Remedy Review Report (URS Group, Inc. [URS] 2006). A brief summary of the regulatory actions and investigation history for ERP Site FT-08 is shown in Table 2-1.

Groundwater Monitoring Well Installation (1989-2004)

The U.S. Army Corps of Engineers (USACE) installed three regional groundwater monitoring wells (two downgradient and one upgradient) in 1989. Groundwater sampled from these wells at the time of installation indicated that TCE was present at low concentrations (about 1.0 to 2.0 micrograms per liter [$\mu\text{g/L}$]) and that total petroleum hydrocarbons (TPH) were not detectable. Over time, the three wells went dry due to a dropping regional groundwater table. A new replacement well (MW11-2) was installed in 2000 adjacent to MW11, and an additional monitoring well (MW28) was installed adjacent to ERP Site FT-08 in 2004. Concentrations of TCE from these wells have also been consistent with historical concentrations. Further detail concerning sampling results and well locations are provided in Sections 2.5.3 and 2.5.4 of this document.

OU-4 Remedial Investigation and Baseline Risk Assessment (Woodward-Clyde Consultants [WCC] 1991)

A Remedial Investigation/Baseline Risk Assessment (RI/BRA) was completed for ERP Site FT-08 in 1991. Soil samples were collected and analyzed for semivolatile organic compounds (SVOCs) and metals. No SVOCs were detected above laboratory reporting limits and trace metal concentrations were detected below background levels.

The results of the risk assessment indicated the reasonable maximum exposures to soil and airborne contaminants were not expected to result in adverse non-carcinogenic human health effects (indicated by a Hazard Index [HI] less than 1.0) or excess cancer risks (results did not exceed EPA's target risk range of 1×10^{-4} to 1×10^{-6}).

Record of Decision (EPA 1992)

No Action was the selected remedy for ERP Site FT-08, OU-4. The selected remedy was based on the results of the human health risk assessment, which determined that the contaminants in the soil at ERP Site FT-08 posed no unacceptable risks to human health based on an acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6} and an industrial land use scenario. The maximum estimated hypothetical carcinogenic on-site residential risk was 3.9×10^{-5} . The ROD did not include restrictions on land use to ensure that residential exposures would not occur.

2001 Five-Year Remedy Review (Foothill Engineering Consultants, Inc. [FEC] 2001)

A Five-Year Remedy Review was completed in 2001 to determine whether selected remedies as documented in the RODs for various ERP sites at Mountain Home AFB remained protective of human health and the environment. The report summarized previous risk assessment results as follows: the excess cancer risk calculated for the current occupational worker (2.9×10^{-6}), future construction worker (1.8×10^{-6}), and a hypothetical on-site resident (3.9×10^{-5}) exceeded the protectiveness goal considered at that time for future unrestricted use of 1×10^{-6} . In addition, the 1992 ROD did not include controls to prevent unacceptable risk due to exposure to potentially contaminated soil under other use scenarios. The report recommended additional characterization to reassess whether ERP Site FT-08 posed a threat to regional groundwater and whether impacted media at ERP Site FT-08 posed any unacceptable human health risks.

Bedrock Vapor Investigations (2002-2009)

During past environmental investigations under the ERP at Mountain Home AFB in 2002, the fractured basalt vadose zone was discovered to contain vapor-phase VOCs. A bedrock vapor monitoring program was added to the groundwater Long-Term Monitoring (LTM) Program beginning with a six-month investigation from September 2002 through February 2003 (RMC Consultants, Inc. [RMC] 2003).

Bedrock vapor sampling has been completed in monitoring well MW28 and new well MW39 (at ERP Site FT-08) since 2004 and January 2009, respectively. Bedrock vapor monitoring results have been summarized in annual LTM Reports leading up to the most current published report for the 2008 LTM (URS 2009b). More details concerning bedrock vapor sampling and results for MW28 and MW39 are provided in Sections 2.5.3 and 2.5.4 in this ROD amendment. Additionally, a cross-sectional depiction of the bedrock vapor sampling results for TCE for MW28 and other nearby wells is presented on Figure 2-17 in the Final FT-08 RI/BRA Addendum (URS 2009a).

17 Sites Evaluation/Investigation (URS 2004)

ERP Site FT-08 was re-evaluated as part of the 17 Sites Evaluation/Investigation with no sampling proposed at that time.

2006 Five-Year Remedy Review (URS 2006)

A Five-Year Remedy Review was completed in 2006 to determine whether selected remedies as documented in the RODs for various ERP sites at Mountain Home AFB remained protective of human health and the environment. Similar to the 2001 Five-Year Remedy Review, the report concluded the calculated reasonable maximum exposure (RME) excess cancer risk for the hypothetical on-site adult resident (3.9×10^{-5}) exceeded the protectiveness goal considered at that time (an excess carcinogenic risk not to exceed 1×10^{-6}).

The 2006 Five-Year Remedy Review recommended selection of a remedial system for soils at ERP Site FT-08 that will result in closure using EPA Region 9 residential Preliminary

Remediation Goals (PRGs) as remedial target levels. A pilot study was also recommended to evaluate SVE as a potential remedial technology for removing COCs from the shallow overburden soils and shallow bedrock. The report concluded that a BRA amendment, Focused Feasibility Study, and Proposed Plan should be completed to consider active remediation of ERP Site FT-08 to address TCE contaminant levels in soils and remediation of soils and shallow bedrock. Furthermore, the report noted a ROD amendment was required to select and implement a remedial technology for ERP Site FT-08. The report also stated the Air Force prefers active remediation of ERP Site FT-08 rather than institutional controls due to the land use limitations and restrictions and long-term costs associated with the implementation of land use controls (LUCs) (URS 2006).

Vapor Extraction Pilot Study (URS 2007a)

Soil and bedrock vapor extraction pilot tests were completed from July 12 to August 25, 2006 to verify that the technology is appropriate for ERP Site FT-08 soil conditions and to obtain the necessary information to design a full-scale remedial system that is expected to achieve closure with UU/UE. Soil samples were collected to confirm that pilot test vapor extraction (VE) wells were located within zones of significant contaminant sources. Soil samples were obtained during drilling of each of the soil borings (6 locations) from the interval exhibiting the highest field VOC screening. Soil samples were analyzed for VOCs, total organic carbon (TOC), and moisture content.

Results of the SVE pilot tests concluded VE technology would be highly effective for remediation of VOCs in shallow soils. In addition, the pilot test data for the bedrock tests suggest that COCs are recoverable at ERP Site FT-08 from the one bedrock extraction well (BEW) installed and tested. Removal rates in bedrock were less than 1.1 and 0.3 pounds per day of TCE and BTEX, respectively. The report recommended a longer-term remedy implementation optimization study should be implemented to obtain additional information. Detailed results of the pilot study are documented in the Final Vapor Extraction Pilot Study Technical Report (URS 2007a).

Pilot Remedy Optimization Testing (URS 2008)

Pilot remedy optimization testing resumed in June 2007 to verify that the technology is appropriate for ERP Site FT-08 soil conditions and to obtain the necessary longer-term information to design a full-scale remedial system. Based on the results of the pilot remedy optimization SVE tests conducted at ERP Site FT-08, it was concluded that SVE technology was highly effective for remediation of VOCs in the overburden soils at ERP Site FT-08. Additional details of the study through August 2008, including results for the study are included in the Draft Pilot Remedy Optimization Testing Technical Report (URS 2008).

Well Installation (URS 2009c)

Based on information collected at ERP Site FT-08 since completion of the 1992 ROD for OU-4, the Federal Facility Agreement (FFA) team for Mountain Home AFB decided an additional groundwater monitoring well with bedrock vapor ports was required at ERP Site FT-08. The

justification for the well was to verify groundwater quality at the source area and to provide additional bedrock vapor monitoring points and an additional groundwater monitoring point to monitor potential changes in bedrock vapor or groundwater contaminant concentrations during the ERP Site FT-08 soil remediation. The new well (MW39) was installed in January 2009 immediately to the north of the old FT-08 burn pit. Laboratory results indicate TCE is present in groundwater at this location at a maximum concentration of 1.1 µg/L (URS 2009c).

Remedial Investigation/Baseline Risk Assessment Addendum (URS 2009a)

Since the original RI/BRA in 1991, ERP Site FT-08 has undergone several additional phases of investigation and/or evaluation as summarized above. A RI/BRA Addendum was completed to present the additional information that was collected and reassess the potential for unacceptable human health or ecological risks to determine whether remedial action is warranted. This was considered necessary because new, higher concentrations of some chemicals of potential concern (COPCs) (primarily TCE) were detected in ERP Site FT-08 soil since the pre-ROD investigations, and the presence of VOC vapors in the bedrock vadose zone was also discovered since the original RI/BRA. Detailed results are included in the Final FT-08 RI/BRA Addendum (URS 2009a). RI/BRA Addendum recommendations included the following:

- Based on the potential human health risks, ERP Site FT-08 is not protective for occupational or hypothetical future residential receptors in the near or long term and should be evaluated for remedial action.
- The PRGs that are considered protective of human health should be carried forward to a Feasibility Study (FS) to determine the most appropriate remedial alternative for ERP Site FT-08.
- ERP Site FT-08 is considered a potential source of TCE to the bedrock vadose zone and ultimately to regional groundwater. Monitoring well MW39 (installed in 2009) will be used, in conjunction with other site and nearby wells, to monitor conditions in the bedrock and groundwater at ERP Site FT-08.
- Future documents (e.g., Remedial Action Work Plan) should develop criteria for determining if and when active remediation of bedrock vapors is needed based on the bedrock vapor and regional groundwater analytical data results of future sampling at all applicable ERP Site FT-08 monitoring wells.

Feasibility Study (URS 2009d)

A FS was completed to identify remedial action objectives (RAOs) and to evaluate, screen, and develop remedial alternatives for ERP Site FT-08. The FS evaluated the following alternatives: no action; institutional controls; soil removal and landfill; and SVE.

Proposed Plan (URS 2009e)

In accordance with the NCP, the Air Force issued a Proposed Plan for ERP Site FT-08 in August 2009. The Proposed Plan identified the Preferred Alternative, SVE, for chlorinated- and petroleum-related VOC contamination in soil at ERP Site FT-08. The Air Force issued a public

notice of availability, provided a public comment period, and held a public meeting as required by the NCP (see Section 2.3). No significant changes were made to the preferred remedial action alternative identified in the Proposed Plan as a result of the public meeting and comment period.

2.3 COMMUNITY PARTICIPATION

The Air Force and EPA provide information regarding the cleanup of Mountain Home AFB to the public through the community relations program, which includes a Restoration Advisory Board, public meetings, the Administrative Record file for ERP Site FT-08, the information repository, and announcements published in local newspapers.

Mountain Home AFB provided a public comment period from January 7, 1992 through February 15, 1992 for the original Proposed Plan for ERP Site FT-08. An announcement for the public meeting was published in the Idaho Statesman and local Mountain Home newspapers. The public meeting to present the Proposed Plan was held on January 22, 1992 at the Mountain Home High School in Mountain Home, Idaho.

Pursuant to CERCLA Section 117 (42 USC Section 9617) and the NCP at 40 CFR 300.435(c)(2)(i), in 2009 Mountain Home AFB prepared a Revised Proposed Plan as a result of a fundamental change to the originally selected remedy for ERP Site FT-08. Mountain Home AFB provided a public comment period from August 18, 2009 through September 16, 2009 for the Revised Proposed Plan for ERP Site FT-08. An announcement of the availability of the Revised Proposed Plan and supporting documentation, the public comment period, and the public meeting was published in the Idaho Statesman and local Mountain Home newspapers. The public meeting to present the Revised Proposed Plan was held on September 9, 2009 at Mountain Home City Hall, located in Mountain Home, Idaho. The public participation activities were consistent with the requirements of CERCLA Sections 113(k)(2)(B)(i-v) and 117 [42 USC Sections 9613(k)(2)(B)(i-v) and 9617].

The Revised Proposed Plan and previous investigation reports for ERP Site FT-08 are available to the public in the updated Administrative Record and Information Repository maintained at:

Mountain Home AFB
1181 Desert Street, Building 1296
Mountain Home AFB, ID 83648
Mr. Richard Roller
(208) 828-6667

All documents and a copy of this Proposed Plan are also available at:

MHAFB Library
520 Phantom Ave
Building 2427
Mountain Home AFB, ID 83648
(208) 828-2326

Library Hours:

Monday-Thursday: 11:00 a.m. to 8:00 p.m.

Friday 11:00 a.m. to 6:00 p.m.

Weekends: 12:00 p.m. to 6:00 p.m.

City of Mountain Home Public Library

790 North 10th East Street

Mountain Home, ID 83647

(208) 587-4716

Library Hours:

Monday-Friday: 10:00 a.m. to 7:00 p.m.

Saturday: 9:00 a.m. to 5:00 p.m.

2.4 SCOPE AND ROLE OF OPERABLE UNITS AND RESPONSE ACTION

The Air Force has organized work to date at Mountain Home AFB into six OUs. The current CERCLA status and schedule of remedial actions for each OU is detailed in the Management Action Plan which can be found in the Administrative Record File. ERP Site FT-08 is organized into two OUs:

- OU-3: Basewide groundwater and the vadose zone bedrock
- OU-4: ERP Site FT-08 soil

This ROD Amendment documents the rationale for selection of the amended remedy for soil at ERP Site FT-08 (OU-4). Although the ROD Amendment includes activities and information associated with the bedrock vadose zone and groundwater at ERP Site FT-08, any necessary remedy for these media will be addressed separately as part of a separate OU-3 ROD Amendment.

The proposed action will be the final action for soil at ERP Site FT-08. The general remedial objective at ERP Site FT-08 is to remediate chlorinated and petroleum-related VOCs in soil and soil gas to UU/UE standards (residential) which equate to compound-specific human health based cleanup levels. The Air Force has a further goal of eventually achieving regulatory site closure with unrestricted site use potential.

2.5 SUMMARY OF SITE CHARACTERISTICS

2.5.1 Site Overview

ERP Site FT-08 encompasses approximately 0.5 acre in the southeastern part of Mountain Home AFB. There are no aquatic/wetland habitats on ERP Site FT-08. Areas of archaeological or historical importance have not been identified at ERP Site FT-08.

The surficial geology at ERP Site FT-08 consists in general of about 0.5 to 1.0 foot of surface fill materials consisting of compacted crushed asphalt, gravel, sand, and silt followed by about 3 to 8

feet of sandy silt or silty sand with occasional gravelly layers followed by about 6 feet to 10 feet of silty sand or poorly graded sand with occasional gravelly layers and caliche cemented nodules. These soils generally overlie relatively thin (typically 1 to 2 feet thick, but up to about 6 feet thick) discontinuous layers of silt that exhibit some minor gravel, sand, and silty clay found at typical depths of about 13 to 15 feet below ground surface (bgs). The thickest layer of silt was observed in one boring (Boring S-10) between depths of about 15 to 22 feet bgs. A thick silt layer was also observed in a Site Investigation (SI) boring drilled southwest of the burn pit between depths of 0.5 and 7 feet bgs. Some SI borings drilled southwest of the burn pit also encountered silt to silty clay up to 1.5 feet thick resting on top of the basalt bedrock. The overburden soils all rest on basalt, which has an irregular surface that varies in depth from about 12 to 23 feet bgs, depending on location. In the immediate vicinity of the former burn pit, the depth to basalt ranges from about 12 to 15 feet bgs. Figures, with geologic cross-section lines, presenting a summary of all historical sampling points at ERP Site FT-08 are included in the FT-08 RI/BRA Addendum (URS 2009a).

2.5.2 Conceptual Site Model

The source of contamination at ERP Site FT-08 is chlorinated- and petroleum-related VOCs in soil and soil gas. The conceptual site model (CSM) for ERP Site FT-08 shows the sources, transport mechanisms, exposure routes, and potential human or ecological receptors (Figure 2-3). The human health and ecological risk assessments and the subsequent RAOs for ERP Site FT-08 were based on this CSM. While the CSM includes the groundwater pathway, the focus of the CSM for this ROD Amendment is direct exposure to impacted soil, with groundwater addressed separately under OU-3. Key elements of the CSM are:

- Chlorinated- and petroleum-related VOCs remain present in the overburden soils and soil gas at concentrations of concern. Resultant estimated potential human health risks are unacceptable for meeting the criteria for UU/UE.
- Chlorinated- and petroleum-related VOCs remain present in the vapor phase in fractured bedrock vapor at depths up to approximately 300 feet; however, the Air Force does not currently consider ERP Site FT-08 to be a primary concern for unacceptable impacts to regional groundwater. However, the EPA and DEQ are concerned about potential impacts to the regional aquifer, and these concerns are reflected in requirements to monitor ERP Site FT-08 through periodic sampling of wells (bedrock vapor and groundwater samples) under OU-3. Criteria will be developed in OU-3 documents to assess the protectiveness to human health and the environment and the need for a potential remedial action for bedrock vapor and groundwater.

2.5.3 Sampling Strategy

Soil

Three soil borings were drilled and six soil samples were collected under the IRP Phase II, Stage I conducted in 1986 (Dames and Moore 1986). Chemical analysis indicated a wide variety of contaminants (TOX, TOC, oil and grease, and lead) found in unpredictable, dispersed patterns. Boring locations and results are depicted on Figure 2-4.

Additional soil sampling and chemical analysis (VOCs, TPH, and lead) were completed for the IRP Phase IV-A in 1986 and 1988 (RCC 1989). Eight borings were drilled in September 1986, and an additional three borings were drilled in March 1988. Generally, the contamination was limited to the surface and shallow soils located within the former bermed area. Figure 2-4 summarizes the historical results for TOX and TCE (gray shaded).

Soil samples were collected from the shallow soils beneath the crushed asphalt cover over the former bermed area and analyzed for SVOCs and metals as part of the 1991 RI/BRA (WCC 1991). There were no detections of SVOCs in the samples. Sample locations are included on Figure 2-4.

Six soil borings were completed to bedrock in support of the Multiple Sites Investigation in 2002 (URS 2003). Two soil samples per boring were analyzed by a fixed-base analytical laboratory for VOCs. The results of this investigation indicated that many VOC concentrations in ERP Site FT-08 soils exceeded compound-specific screening criteria (Figure 2-4).

Soil samples were collected from six locations during the Vapor Extraction Pilot Study (URS 2007a). Soil samples were analyzed for VOCs, TOC, and moisture content. Soil sampling locations and analytical results are presented on Figure 2-4.

Soil Gas

Seventeen direct-push soil gas samples were collected at the soil/bedrock contact as part of the Multiple Sites Investigation in 2002 (URS 2003). Samples were analyzed with a field gas chromatograph for VOCs. Locations are included on Figure 2-4. Furthermore, a passive GORE-SORBER® survey was completed at ERP Site FT-08 in 2005 specifically to identify potential areas of concern for VOCs. The results of the survey are presented in Appendix A of the FT-08 RI/BRA Addendum (URS 2009a).

Bedrock Vapor

Bedrock vapor sampling has been completed in monitoring well MW28 and other nearby monitoring wells since 2004. The nearest monitoring wells to ERP Site FT-08 that also contain bedrock vapor sampling ports include MW36, MW29, MW34, and MW39. Locations and historical results of those monitoring wells at ERP Site FT-08 (MW28 and MW39) are shown on Figure 2-5.

Regional Groundwater

The USACE installed three regional groundwater monitoring wells (two downgradient and one upgradient) in 1989. Since that time, the three wells have gone dry with one of the wells (MW11) being replaced in 2000 by monitoring well MW11-2. Additionally, a new monitoring well (MW28) was installed adjacent to ERP Site FT-08. Regional groundwater and bedrock vapor monitoring well MW28 was installed at ERP Site FT-08 in September 2004 (RMC 2005), and MW39 was installed in early 2009 (URS 2009b). Well locations and historical results are included on Figure 2-5.

2.5.4 Nature and Extent of Contamination

Soil

The depiction of soil sampling results at ERP Site FT-08 (Figure 2-4) illustrates the most heavily impacted area of soil is located about 75 feet southwest of the former burn pit. To illustrate the lateral and vertical distribution of TCE and BTEX soil contamination across ERP Site FT-08, geologic cross-sections inclusive of all phases of investigative work are included in the FT-08 RI/BRA Addendum as Figures 2-10 through 2-15 (URS 2009a).

Soil Gas

The results of the soil gas sampling completed in 2002 are illustrated on Figure 2-4. This figure shows the area with the highest concentrations of TCE in soil gas is also located about 75 feet southwest of the former burn pit. The maximum detected TCE concentration in all soil gas samples was 306,600 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), and the maximum detected benzene concentration was 325,483 $\mu\text{g}/\text{m}^3$ (approximately in the center of the former burn pit). The maps depicting the GORE-SORBER® survey results in Appendix A of the FT-08 RI/BRA Addendum (URS 2009a) also show that the highest concentrations of ERP Site FT-08 COPCs in soil gas appear to be located in this same area southwest of the former burn pit.

Bedrock Vapor

Bedrock vapor monitoring results for wells MW28, MW36, MW29, and MW34 at or near ERP Site FT-08 have been summarized in annual LTM Reports leading up to the most current published report, the Final 2008 Long-Term Monitoring Annual Report (URS 2009b). Bedrock vapor sampling results for TCE in the vapor ports contained in MW28 and MW39 are presented on Figure 2-5. Additional information, including figures further describing the nature and extent of bedrock vapor results at ERP Site FT-08, are included in the FT-08 RI/BRA Addendum (URS 2009a).

Regional Groundwater

Regional groundwater sampling has been completed in monitoring wells at and in the vicinity of ERP Site FT-08 since approximately 1989. Groundwater sampling results for these wells have been summarized in annual LTM Reports including the most recent report, the Final 2008 Long-Term Monitoring Annual Report, that covers the sampling histories of all monitoring wells but MW11 (URS 2009b). The TCE detection history of monitoring wells associated with ERP Site FT-08 is shown on Figure 2-5. Concentrations of TCE in wells at ERP Site FT-08 have ranged from less than 1 $\mu\text{g}/\text{L}$ to 2.7 $\mu\text{g}/\text{L}$.

2.5.5 Potential Routes of Migration

The primary fate and contaminant migration pathways for soil at ERP Site FT-08 are depicted on Figure 2-6. These include potential indoor air intrusion into buildings; vapor transport through bedrock fractures enhanced by barometric pumping; potential historical aqueous infiltration or

aqueous phase partitioning; potential vapor partitioning to groundwater; or potential migration through open hole during monitoring well drilling or well annulus after construction due to a poorly designed or compromised annular seal. Although the potential for historical contaminant migration from ERP Site FT-08 to underlying groundwater exists, this medium is addressed in more detail as a separate OU (OU-3) at Mountain Home AFB and is not a part of this ROD Amendment.

2.6 CURRENT AND POTENTIAL FUTURE SITE LAND AND RESOURCE USES

ERP Site FT-08 is located in the south-central portion of Mountain Home AFB at the south end of the industrialized flightline area (Figure 2-2). The ERP Site FT-08 area and adjacent land is classified as light industrial land use. While the reasonably anticipated future land use for ERP Site FT-08 is to remain light industrial as defined by the Base General Plan, the Air Force goal is to achieve UU/UE status for environmental sites. This protectiveness goal of unrestricted use is preferred in order to provide mission flexibility and prevent long-term management and expenses at ERP sites such as ERP Site FT-08. The regional aquifer, which includes groundwater underlying ERP Site FT-08 (OU-3), supplies all potable water for Mountain Home AFB, which includes approximately 8,000 personnel. Additionally, the groundwater is used regionally for irrigation purposes. The Air Force has no plan to change the existing land or resource use in the foreseeable future.

2.7 SUMMARY OF SITE RISKS

A BRA was completed to identify and characterize the current and potential future risks associated with ERP Site FT-08 if no remediation is implemented. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. A BRA was previously completed for ERP Site FT-08 (WCC 1991) using available data and risk assessment methodologies that were current at the time. Due to the large amount of additional data collected at ERP Site FT-08 since signing the 1992 OU-4 ROD; the discovery of new and higher maximum contaminant concentrations in media at ERP Site FT-08; and changes in risk assessment procedures and toxicity information, the BRA for ERP Site FT-08 was re-evaluated. Details concerning the previous BRA and the re-evaluation of risk are included in the FT-08 RI/BRA Addendum (URS 2009a).

As part of the FT-08 RI/BRA Addendum, ERP Site FT-08 was re-evaluated for ecological risk to determine whether the conclusion reached during the 1991 RI/BRA, that an ecological risk assessment was not required due primarily to a lack of viable habitat, was still valid. The FT-08 RI/BRA Addendum concluded that ERP Site FT-08 still warrants no concern for ecological risk (URS 2009a).

The response action selected in this ROD Amendment is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

2.7.1 Baseline Risk Assessment Summary

A BRA was completed in 1991, and was re-evaluated as part of the FT-08 RI/BRA Addendum (URS 2009a). A review of the information from the 1991 BRA determined it was not necessary to re-evaluate the 1991 BRA in its entirety (i.e., for any of the exposure routes except for inhalation) since the inhalation of VOCs accounted for 92 to over 99 percent of the potential human health risk for both carcinogenic and noncarcinogenic risk for the various receptors evaluated. The FT-08 RI/BRA Addendum updated the evaluation of potential inhalation risks due not only to the potential for vapor intrusion into indoor air, but also for soil exposure routes for the most conservative scenarios (residential and occupational). This approach was considered appropriate since the risk-derived protective contaminant levels using these scenarios would also be protective of other non-inhalation scenarios. Risk for an occupational site worker and hypothetical on-site resident for soil exposure is assumed to be unacceptable at ERP Site FT-08 if no soil remediation is completed. A detailed discussion of potential risks is provided in the FT-08 RI/BRA Addendum (URS 2009a). All risk assessment summary tables are provided in Appendix A, and a summary of the results of the revised BRA is presented below.

The FT-08 RI/BRA Addendum (URS 2009a) did not utilize reference concentrations and unit risks for evaluating inhalation exposures, as provided in Risk Assessment Guidance for Superfund (RAGS) Part F (finalized in January 2009), since the addendum was under development using an agreed upon approach and was finalized shortly thereafter. However, the use of the newer methodology would result in similar or higher cleanup levels that are less protective than those developed as part of the BRA addendum.

Additionally, during finalization of the FT-08 RI/BRA Addendum (URS 2009a), EPA's RAGS Part F changed the way inhalation exposures are evaluated for human health, including use of Regional Screening Levels (RSLs) in place of EPA Region 6 Medium Specific Screening Levels (MSSLs). RSLs for ethylbenzene and naphthalene became available for these chemicals to be evaluated as carcinogens, unlike the EPA Region 6 MSSLs. As such, while naphthalene was not originally retained as a COPC, the current screening level (3,900 micrograms per kilogram [$\mu\text{g/kg}$]) resulted in it now being considered a COPC. Therefore, naphthalene was added as a COPC in soil, and risk-based cleanup levels were established for naphthalene in soil and soil gas (Table 2-3). Furthermore, the risk-based cleanup levels presented in Table 2-3 account for the change to evaluate ethylbenzene as a carcinogen.

2.7.1.1 Identification of Chemicals of Potential Concern

The maximum detected concentrations from the post-ROD ERP Site FT-08 investigations were compared to EPA Region 6 MSSLs in order to select COPCs to be carried through the exposure and toxicity assessment and the risk characterization. If a chemical exceeded the screening value, the chemical was included in the COPC list. Soil gas screening levels were developed by adjusting the EPA Region 6 indoor air screening level (an acceptable risk-based indoor air concentration for the residential scenario) by an assumed attenuation factor of 0.02 at the request of the EPA (URS 2007b). The purpose of this initial screening was to allow chemicals that do not contribute significantly to the risk to be eliminated early in the risk assessment process. Maximum concentrations, instead of statistically-derived values, of contaminants of concern

from the entire historical analytical data set for ERP Site FT-08 were used as exposure point concentrations (EPCs) in order to provide a conservative approach to the risk re-evaluation.

Soil

Thirteen COPCs in soil were identified at ERP Site FT-08. These include the following:

- Benzene
- Chloroform
- Ethylbenzene
- Methylene chloride
- Methylcyclohexane
- Naphthalene
- Tetrachloroethylene
- TCE
- Toluene
- 1,2,4-trimethylbenzene
- 1,3,5-trimethylbenzene
- *m,p*-xylene
- *o*-xylene

The COPCs and EPCs to estimate the risk using all available data are provided in Appendix A as Table A-1. Detailed information for the selection of COPCs in soil at ERP Site FT-08 is provided in Section 3.2.5.1 of the FT-08 RI/BRA Addendum (URS 2009a).

Soil Gas

Nine COPCs in soil gas were identified at ERP Site FT-08. These include the following:

- Benzene
- Chloroform
- cis-1,2-dichloroethene
- 1,1-dichloroethane
- 1,1-dichloroethene
- Ethylbenzene
- Toluene
- TCE

- *o*-xylene

The COPCs and EPC to estimate the risk using all available data are provided in Appendix A as Table A-2. Detailed information for the selection of COPCs in soil gas at ERP Site FT-08 is provided in Section 3.2.5.1 of the FT-08 RI/BRA Addendum (URS 2009a).

2.7.1.2 Exposure Assessment

The human health exposure assessment identifies and evaluates the contaminant sources, release mechanisms, exposure pathways, exposure routes, and receptors. The elements of the exposure assessment for ERP Site FT-08 are identified in the CSM (Figure 2-3). A detailed discussion of the exposure assessment for occupational site worker and hypothetical on-site resident scenarios considered in the BRA is provided in Section 3.2.2 of the FT-08 RI/BRA Addendum (URS 2009a). Estimates of risk were developed for ERP Site FT-08 by evaluating exposure to soil and soil gas for the occupational worker and hypothetical on-site resident as follows:

- **Occupational Worker** – The current and future occupational worker is a site worker that is assumed to be on site 8 hours per day and 5 days per week for 50 weeks of the year for the both the central tendency exposure (CTE) and RME. Pathways include inhalation, ingestion and dermal contact with surface soil as well as inhalation of volatile emissions due to indoor air vapor intrusion from subsurface soil.
- **Hypothetical On-Site Resident** – The resident is a hypothetical receptor added to provide an evaluation of ERP Site FT-08 under an UU/UE scenario. The hypothetical on-site resident was assumed to be home 24 hours per day for both the CTE and RME and 270 days per year for CTE and 365 days for RME. Potential exposure pathways include inhalation, ingestion and dermal contact with surface soil as well as inhalation of volatile emissions due to indoor air vapor intrusion from subsurface soil.

2.7.1.3 Toxicity Assessment

The toxicity assessment provides a numerical estimate of the relationship between the extent of exposure and possible severity of adverse effects, and consists of two steps: hazard identification and dose-response assessment. Most toxicity data used in the BRA are EPA published toxicity values (carcinogenic unit risk factors [URFs] and noncarcinogenic reference doses [RfDs]) in the Integrated Risk Information System [IRIS]). The following two sources were consulted when IRIS values were not available: provisional toxicity values recommended by EPA's National Center for Environmental Assessment (NCEA) and Health Effects Assessment Summary Tables (HEAST). If inhalation toxicity data could not be obtained from IRIS, NCEA, or HEAST, inhalation toxicity factors were extrapolated from toxicity data for oral exposure. Specifically for TCE, the source for toxicity data is the California Environmental Protection Agency (Cal EPA). Toxicity data used in risk evaluations are provided on Table A-3 (cancer) and Table A-4 (non-cancer). A detailed discussion of the toxicity assessment is provided in Section 3.2.3.1 of the FT-08 RI/BRA Addendum (URS 2009a).

2.7.1.4 Risk Characterization

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated using the following equation:

$$\text{Risk} = \text{CDI} \times \text{SF}$$

where:

Risk = a unitless probability (e.g., 2×10^{-5}) of an individual's developing cancer

CDI = chronic daily intake averaged over 70 years (milligrams per kilogram per day [mg/kg-day])

SF = slope factor, expressed as (mg/kg-day)⁻¹

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-5}). An excess lifetime cancer risk of 1×10^{-5} indicates that an individual experiencing the RME estimate has a 1 in 100,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other natural causes. EPA's generally acceptable risk range for site-related exposures is 1×10^{-4} to 1×10^{-6} .

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with an RfD derived for a similar exposure period. A RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). A $\text{HQ} < 1$ indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The HI is generated by adding the HQs for all COCs that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. A $\text{HI} < 1$ indicates that, based on the sum of all HQs from different contaminants and exposure routes, toxic noncarcinogenic effects from all contaminants are unlikely. A $\text{HI} > 1$ indicates that site-related exposures may present a risk to human health. The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD}$$

where:

CDI = chronic daily intake

RfD = reference dose

Detailed risk characterization results are provided in Section 3.2.5.2, Tables 3-7 and 3-8, and Appendices E and F of the FT-08 RI/BRA Addendum (URS 2009a). A risk characterization summary is presented below:

- **Occupational Worker** – The estimated potential excess carcinogenic risk to this receptor is 3×10^{-3} . This estimated risk is due almost entirely to indoor air inhalation of TCE and benzene. The estimated noncarcinogenic HI for this receptor is 209, which exceeds the target value of 1.0. A summary of risks by pathway is included in Table 2-2, while a summary of inhalation risks by compound is provided on Table A-5.
- **Hypothetical Future On-Site Resident** – The estimated potential excess carcinogenic risk to this receptor is 4×10^{-3} . This estimated risk is due almost entirely to hypothetical indoor air inhalation of TCE and benzene. The estimated noncarcinogenic HI for this receptor is 251, which exceeds the target value of 1.0. A summary of risks by pathway is included in Table 2-2, while a summary of inhalation risks by compound is provided on Table A-5.

2.7.1.5 Uncertainty

The risk measures used in risk assessments are not fully probabilistic estimates of risk but are conditional estimates given that a set of assumptions about exposure and toxicity are realized. Thus, it is important to specify the assumptions and uncertainties inherent in the risk assessment to place the risk estimates in proper perspective. Examples of potential BRA uncertainties include sampling and analysis processes (e.g., distribution and location of samples; detection limits; sample contamination), appropriate selection of receptors, estimating exposure point concentrations, and the extrapolation of toxicity values derived from animal studies to humans. A detailed discussion of the uncertainties associated with the risk assessment is included in Section 3.3 of the FT-08 RI/BRA Addendum (URS 2009a).

2.7.2 Ecological Risk Assessment Summary

During the original RI/BRA in 1991 (WCC 1991), ERP Site FT-08 was considered for potential impacts to ecological receptors. It was determined there was no viable ecological habitat at ERP Site FT-08 due to the small size and developed nature of the area and because there were no sensitive ecological species present. In addition, there is no evidence of migration of contaminants from ERP Site FT-08 to other areas of Mountain Home AFB with ecological resources. Therefore, it was determined an ecological risk assessment was not necessary at ERP Site FT-08 in order to be protective of ecological receptors.

A re-evaluation of the need for an ecological risk assessment was completed as part of the FT-08 RI/BRA Addendum to ensure that protectiveness of non-human species is maintained. The State of Washington Model Toxics Control Act (MTCA) guidance (MTCA 2007) was used to complete this re-evaluation. A screening matrix (Simplified Ecological Terrestrial Evaluation) to determine if an ecological risk assessment is necessary is included as Table 3-14 in the FT-08 RI/BRA Addendum (URS 2009a). Evaluation using this screening matrix concluded that ERP Site FT-08 warrants no further ecological risk consideration (URS 2009a).

2.8 REMEDIAL ACTION OBJECTIVES

It is the judgment of the Air Force and EPA, in consultation with DEQ, that the response actions selected in this ROD Amendment and to be implemented are necessary to protect the public

health and welfare or the environment from actual or threatened releases of hazardous substances into the environment at ERP Site FT-08. The RAO for ERP Site FT-08 is to remediate chlorinated- and petroleum-related VOCs in soil and soil gas to meet the cleanup standards for unlimited use and unrestricted human exposure listed in Table 2-3.

The RAO established for ERP Site FT-08 is based on existing knowledge of the site and current and future potential human health risks at the site. Achievement of this RAO will allow regulatory site closure with unrestricted site use potential. Furthermore, this RAO will reduce the human health risks at ERP Site FT-08 to acceptable levels.

2.9 BASIS FOR AMENDING THE SELECTED REMEDY

This section presents the basis for modification of the original remedy, descriptions of the original and amended remedies, common elements and distinguishing features, and expected outcomes of each remedy.

Since Air Force signature of the June 1992 ROD, re-evaluation of ERP Site FT-08 in the 2001 and 2006 Five-Year Remedy Reviews determined that ERP Site FT-08 required further investigation and evaluation. The results of these additional investigatory activities have resulted in a much more detailed understanding of the nature and extent of contamination related to ERP Site FT-08 and whether ERP Site FT-08 is viewed as a potential unacceptable threat to regional groundwater. The main conclusions that have been reached from these additional activities are:

- Soil impacted with petroleum- and solvent-related contaminants is present in the area of the former burn pit, and in a smaller area about 75 feet southwest of the former burn pit. Impacted soils are present to the bedrock surface beneath the burn pit (mainly petroleum-related), and to shallower depths in the area southwest of the former burn pit (mainly solvent-related). Concentrations of some primary COCs, particularly TCE, have been detected in more recent soil samples at concentrations approximately 5 to 10 times higher than in the historical sample data sets collected in the early 1990s.
- Fractured basalt bedrock beneath ERP Site FT-08 is impacted with site-related contaminants. These appear to consist primarily of heavier fraction petroleum compounds, but includes vapor phase VOCs, including TCE.

Additional details concerning the post-ROD activities, results, and conclusions are provided in the FT-08 RI/BRA Addendum (URS 2009a).

These ERP Site FT-08 conditions led to re-evaluation of the originally selected remedy (No Action). Only the amended remedy is protective of human health and the environment. The difference in terms of remedy components and costs are compared and described below.

2.9.1 Original Selected Remedy

The original selected remedy for ERP Site FT-08 was No Action. At the time it was determined that no action was necessary at ERP Site FT-08 to ensure protection of human health and the

environment. The State of Idaho concurred with the decision to take no action at ERP Site FT-08. This decision was based on the results of the human health risk assessment, which determined that the contaminants remaining in the soils at ERP Site FT-08 posed no unacceptable risks to human health and the environment under an industrial land use scenario. No costs were associated with the original selected remedy.

2.9.2 Amended Remedy

The proposed amended remedy for ERP Site FT-08 soil is SVE, an active unsaturated (vadose zone) soil remediation technology. Major components of the amended remedy are as follows:

- Apply a vacuum to the soil to induce the controlled flow of air and remove chlorinated- and petroleum-related VOC contamination from the soil. The vacuum is applied through VE wells to create a pressure/concentration gradient across ERP Site FT-08 that induces gas-phase volatiles to be removed from soil. The surface of ERP Site FT-08 is crushed asphalt, which has been compacted by vehicle traffic over time, that will act as a lower permeability cap to help prevent the creation of preferential pathways and short circuiting to the surface and to increase the radius of influence of the extraction wells. The estimated volume of soil to be treated is 17,722 bank cubic yards.
- Modify the pilot SVE system currently operating at ERP Site FT-08 to create a full-scale system. Modifications would include burying the vacuum lines that are now placed across the ground surface and improving the condensate removal system. The SVE system configuration is illustrated on Figure 2-7.
- Operate the system until residual soil and soil gas contaminant concentrations are reduced to the cleanup levels in Table 2-3.
- Complete vapor effluent sampling and soil and soil gas sampling. The anticipated confirmation sampling strategy is summarized as follows, but specific monitoring requirements will be included as part of a monitoring plan for FFA team review and approval. Sampling will be completed on a quarterly basis to monitor contaminant concentrations. Once vapor effluent sampling results indicate contaminant concentrations are below the RAOs for soil gas, the SVE system will be shut-off for one week to allow subsurface conditions to equilibrate. Subsequently, soil and soil gas confirmation samples will be collected from the proposed sample locations (three samples per location at five locations) shown on Figure 2-7.
- Evaluate soil and soil gas confirmation sample results.
 - If confirmation samples indicate soil or soil gas contaminant concentrations are above RAOs, the system will be restarted and the system operation, vapor effluent sampling, and confirmation sampling process will continue until RAOs are met.
 - If soil and soil gas contaminant concentrations are at or below the RAOs, the system will remain shut-off, and additional rounds of confirmation samples will be collected three months later and quarterly thereafter, for a total of four additional sampling events. If all four rounds of confirmation samples indicate soil and soil gas contaminant concentrations are at or below RAOs, the system will remain shut-off, be

dismantled with FFA team concurrence, and the remedial action considered complete. However, if results of any round of confirmation samples indicate soil or soil gas contaminant concentrations are above RAOs, system operation will continue as described above.

- Conduct O&M activities until cleanup levels are met. Achievement of cleanup levels will be documented with sampling results and FFA team concurrence before the system is turned off or dismantled.
- Complete five-year reviews, as needed.

The capital costs associated with the amended remedy are \$24,131, annual O&M costs are \$103,700, and periodic costs total \$42,100, with a total present value cost of \$261,000. The estimated costs for the amended remedy are detailed in Table 2-4 and are based on an estimated 2 years to achieve cleanup levels under the amended remedy.

2.9.3 Common Elements and Distinguishing Features

No common elements exist between the original and amended remedies since the original remedy included No Action. Because the two remedies are significantly different from one another (the amended remedy consisting of active remediation and the original remedy consisting of No Action), key distinguishing features are as follows:

- The amended remedy results in the active remediation of soil and soil gas to physically remove volatile contaminants to *in-situ* concentrations below the UU/UE cleanup levels for these media, whereas, the original remedy results in no action for ERP Site FT-08 conditions;
- The estimated time for design, construction, and operation for the amended remedy is 2 years, which is longer than the original remedy which required no time;
- The estimated total present value cost associated with the amended remedy is \$261,000, compared to no costs associated with the original remedy.

2.9.4 Expected Outcomes of Each Remedy

Current land uses are expected to continue at ERP Site FT-08, but the ERP Site FT-08 is expected to be available for UU/UE in 2 years when remedial cleanup levels are achieved. The original remedy (No Action) would not have eliminated nor controlled the risk of exposure to contaminated soil at ERP Site FT-08. The amended remedy (SVE) controls the risk of exposure to contaminated soil, through active remediation.

2.10 COMPARATIVE ANALYSIS OF ALTERNATIVES

A comparative analysis of alternatives was completed to evaluate the relative performance of the originally selected and amended remedies with respect to nine evaluation criteria as required by NCP Section 300.430(f)(5)(i). The evaluation is described below.

2.10.1 Threshold Criteria**Overall Protection of Human Health and the Environment**

Overall protection of human health and the environment addresses whether each remedial action alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Only the amended remedy (SVE) would provide protection of human health from impacted soil by eliminating the risks posed by ERP Site FT-08 through treatment of soil contaminants. The original remedy (No Action) would provide no protection of human health since it does not address the human health risks.

Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA and NCP Section 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate federal and state requirements, standards, criteria, and limitations which are collectively referred to as applicable or relevant and appropriate requirements (ARARs), unless waivers are obtained.

The cleanup levels for ERP Site FT-08 are chemical-specific and risk-based goals derived from To Be Considered (TBC) standards to be protective of a residential scenario. Chemical-specific concentrations, such as maximum contaminant levels (MCLs) for groundwater, are not available for all contaminants in all media; therefore, risk-based cleanup goals were developed using CERCLA risk assessment methodology to ensure consistency in developing cleanup goals that are protective of human health and the environment. There are no ARARs applicable to the original remedy (No Action), but it would not meet human health risk-based cleanup goals. The amended remedy (SVE) would meet human health risk-based cleanup goals and comply with ARARs that may be directly or potentially applicable during this action (e.g., air emissions standards).

2.10.2 Primary Balancing Criteria**Long-Term Effectiveness and Permanence**

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time. This criterion includes the consideration of residual risk for waste that will remain onsite following remediation and the adequacy and reliability of controls.

The original remedy (No Action) does not provide long-term protection of human health and the environment and would leave a residual risk equal to that identified in the baseline risk assessment and its addendum. The amended remedy (SVE) is field-proven and expected to meet long-term remedial objectives. SVE permanently removes contaminants from the soil and soil gas, so no waste remains on site at levels that require land use restrictions.

Reduction in Toxicity, Mobility, or Volume

Reduction of TMV through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

The original remedy (No Action) does not include treatment as a component of the remedy. Therefore, this remedy would not reduce the TMV of contamination at ERP Site FT-08. The amended remedy (SVE) also does not include treatment of contaminated soils as a component of the remedy. However, the amended remedy reduces the potential for human exposure to ERP Site FT-08 soil contaminants through physical removal of contaminants from the soil and soil gas.

Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during construction and operation of the remedy until cleanup levels are achieved.

The original remedy (No Action) does not achieve RAOs and does not have any short-term impacts because no action is implemented. Furthermore, the original remedy has no timeframe to achieve cleanup levels since no action will be taken. For the amended remedy (SVE), there may be short-term impacts to workers, but the workers can be protected through implementation of a site-specific health and safety plan and engineered controls. Mountain Home AFB personnel can be protected during construction through the use of appropriate traffic controls, access controls, and health and safety precautions during construction activities. In addition, minimal risks to the community would be posed during the amended remedy. SVE is expected to achieve cleanup levels in an estimated 2 years.

Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

The original remedy is technically feasible as it requires no action. The amended remedy (SVE) is technically and administratively feasible, although it is more difficult to implement than the original remedy.

Cost

No cost is associated with the original remedy (No Action). The present value cost for the amended remedy (SVE) is estimated to be \$261,000. The amended remedy includes maintenance and performance monitoring costs, estimated at \$212,325 over 2 years, the projected time to achieve cleanup goals.

2.10.3 Modifying Criteria

State/Support Agency Acceptance

State involvement has been solicited throughout the CERCLA process and proposed remedy modification. The DEQ, as the designated state support agency in Idaho, has reviewed this ROD Amendment and concurs with the modification of the remedy.

Community Acceptance

A public meeting was held on September 9, 2009, to present the Proposed Plan for ERP Site FT-08 and answer any questions on the Proposed Plan and on the documents in the Administrative Record for ERP Site FT-08. There were no questions or concerns raised at the meeting. No written comments, concerns, or questions were received by the Air Force, the EPA, or the DEQ during the public comment period for the Proposed Plan from August 18, 2009 through September 16, 2009.

2.11 PRINCIPAL THREAT WASTE

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a site whenever practicable. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. No principal threat wastes are present in soil and soil gas at ERP Site FT-08.

2.12 SUMMARY OF THE RATIONALE FOR THE AMENDED REMEDY

The amended remedy was selected because it achieves the following:

- Provides removal of contaminants from soils to health based levels, thereby, protecting human health and the environment;
- Complies with ARARs of federal and Idaho environmental laws (Appendix B);
- Achieves long-term remedial objectives;
- Reduces the mass of contaminants in soil and soil gas through physical removal of contaminants;
- Ease of implementation with conventional equipment in a relatively short time using standard construction methods; and
- Cost effectiveness.

Although the original remedy has no costs associated with it, risks to potential human receptors from exposure to soil would remain for an indefinite period. The amended remedy is expected to allow unlimited use and unrestricted exposure at ERP Site FT-08. While the costs are significantly higher and implementability is more difficult, the amended remedy will achieve the

long-term remedial objectives and reduce the potential for human exposure to ERP Site FT-08 contaminants through physical removal of contaminants from the soil and soil gas, unlike the original remedy of No Action. Therefore, based on the available information and current understanding of ERP Site FT-08 conditions, the Air Force and the EPA, in consultation with the DEQ, determined that the amended remedy provides the best balance of trade-offs with respect to the nine evaluation criteria.

2.13 STATUTORY DETERMINATIONS

The selected remedy must meet the statutory requirements of Section 121 of CERCLA, 42 USC Section 9621 discussed below. Remedies undertaken at NPL sites must protect human health and the environment, comply with ARARs of both federal and state laws and regulations, be cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the TMV of hazardous waste as their principal element. The following sections discuss the selected remedies in regard to these statutory requirements.

2.13.1 Protection of Human Health and the Environment

The amended remedy protects human health and the environment through removal of contaminants from soil to the compound specific, human health risk-based UU/UE standards, which equate to the cleanup levels provided in Table 2-3. There are no short-term risks anticipated during implementation of the amended remedy that cannot be readily controlled, and there will be no cross-media impacts.

2.13.2 Compliance with Applicable or Relevant and Appropriate Requirements

The amended remedy meets all identified ARARs. Federal and state ARARs, summarized by classification, are presented in Table B-1. In addition, other TBC criteria are included as appropriate for each classification. The classifications of federal and state ARARs identified include chemical-specific, location-specific, and action-specific.

2.13.3 Cost Effectiveness

In the judgment of the Air Force and EPA, the amended remedy is cost effective. In making this determination, the following definition was used: "A remedy shall be cost effective if its costs are proportional to its overall effectiveness." This was accomplished by evaluating the overall effectiveness of those alternatives that satisfied the threshold criteria (protective of human health and the environment and are ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in TMV through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost effectiveness. The relationship of the overall effectiveness of the amended remedial alternative was determined to be proportional to its costs; therefore, the amended remedy for ERP Site FT-08 represents a reasonable value.

The estimated present value cost of the amended remedy is \$261,000. The amended remedy is considered to be cost effective primarily because it provides protection of human health and the environment and achieves long-term effectiveness through reduction of potential human health risks.

2.13.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

The Air Force and EPA, with DEQ concurrence, have determined that the amended remedy represents the maximum extent to which permanent solutions and treatment technologies can be practicably utilized at ERP Site FT-08.

2.13.5 Preference for Treatment as a Principal Element

While the amended remedy (SVE) does not satisfy the statutory preference for remedies that employ treatment as a principal element, the amended remedy reduces the mass of contaminants in soil and soil gas through physical removal of contaminants.

2.13.6 Five-Year Review Requirements

Five-year reviews will be required for ERP Site FT-08 until the cleanup levels are met.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

The selected amended remedy is the same alternative identified as the preferred alternative in the Proposed Plan, which was presented to the public at a meeting held September 9, 2009. This ROD Amendment presents no changes to the Preferred Alternative described in the Proposed Plan.

This document amends the ROD signed by the Air Force on June 16, 1992.

TABLE 2-1
INVESTIGATIONS/REGULATORY ACTIONS - ERP SITE FT-08
MOUNTAIN HOME AFB, IDAHO

Investigations/Regulatory Actions	Reference
Installation Restoration Program (IRP) Phase II, Stage I Study, 1986	Dames and Moore 1986
IRP Phase IV-A Study, 1986 through 1988	RCC 1989
Operable Unit 4 (OU-4) Remedial Investigation (RI) and Baseline Risk Assessment (BRA) were completed in 1991. Cumulative excess carcinogenic risk was estimated at between 1.2E-08 and 3.9E-05 for reasonable maximum exposure (RME) scenarios. Estimates of noncarcinogenic effects, represented as the hazard index (HI), ranged from 7.1E-04 to 3.2E-01 for RME scenarios.	WCC 1991
ROD (OU-4), 1992. No Remedial Action (NRA) was the selected remedy for the site soils.	1992
OU-3 RI, 1995. The site was included for consideration of the potential impact to regional groundwater. Conservative contaminant fate and transport modeling to regional groundwater was completed to evaluate whether FT-08 posed an unacceptable threat to regional groundwater quality. The 30-year average groundwater concentration of trichloroethene (TCE) was estimated to be 7 micrograms per liter (µg/L). This concentration of TCE has never been reported in site monitoring wells, with the highest historical TCE concentration in groundwater at 2.7 µg/L.	WCC 1995
2001 Five-Year Remedy Review Report. The report concluded that Site FT-08 would not meet the criteria for unlimited use/unrestricted exposure (UU/UE) and recommended additional characterization to determine whether the site posed a threat to regional groundwater, and whether impacted site media pose any unacceptable potential human health risks.	FEC 2001
Site Investigation (SI), 2002. Completed soil sampling and analysis primarily to evaluate the site's potential as a source of TCE to the regional aquifer. Also completed a limited soil vapor extraction (SVE) test to determine the viability of SVE at the site.	URS 2003
Passive soil gas survey (GORE-SORBER®), July 2004, to identify and delineate potential TCE and other volatile organic compound (VOC) source areas or "hot spots."	RMC 2005
Re-evaluated (but not re-investigated) in the 17 Sites Evaluation/Investigation.	URS 2004
Regional groundwater and vapor monitoring well MW28 was installed at the site in Fall 2004, as part of the OU-3 Long-Term Monitoring (LTM) program. Regional groundwater and bedrock vapor has been monitored since the installation of this well.	RMC 2005
2006 Five-Year Remedy Review Report. Similar to the 2001 report, the 2006 report concluded that Site FT-08 would not meet the criteria for UU/UE and recommended additional evaluation of potential human health risks.	URS 2006a
Soil and bedrock vapor extraction pilot tests were completed from July 12 to August 25, 2006. The results were documented in the pilot study technical report.	URS 2007a
Pilot Remedy Optimization Testing resumed starting in July 2007 to gather additional information on SVE at the site. Evaluation of collected data through August 2008 supports the viability of SVE for the site.	URS 2008a
In accordance with the Work Plan completed in 2008, a new monitoring well (MW39) was installed at the site in January 2009. This well was installed in order to monitor site conditions in the bedrock vadose zone and in regional groundwater during remedial action and LTM.	URS 2008b
A RI/BRA Addendum was completed to present the additional information collected and reassess the potential for unacceptable human health or ecological risks to determine whether remedial action is warranted.	URS 2009a
A Feasibility Study (FS) was completed to identify remedial action objectives and to evaluate, screen, and develop remedial alternatives for the site. The FS evaluated the following alternatives: no action; institutional controls; soil removal and landfill; SVE; and enhanced biodegradation. The FS identified SVE as the Preferred Alternative.	URS 2009b
The Air Force issued a Proposed Plan for ERP Site FT-08 in August 2009, with a public comment period from August 18, 2009 through September 16, 2009 and a public meeting on September 9, 2009 to present the Proposed Plan.	URS 2009c

TABLE 2-2
CURRENT RISK BY PATHWAY - ERP SITE FT-08
MOUNTAIN HOME AFB, IDAHO

Exposure Scenario	Central Tendency Exposure		Reasonable Maximum Exposure	
	Risk	Hazard Index	Risk	Hazard Index
<u>Residential</u>				
Soil Ingestion	1.90E-08	0.04	8.70E-07	0.47
Soil Dermal	7.00E-08	0.13	5.90E-06	3.2
JEM Vapor Intrusion inhalation	<u>4.00E-03</u>	<u>247</u>	<u>4.00E-03</u>	<u>247</u>
Total:	4.E-03	247	4.E-03	251
<u>Occupational</u>				
Soil Ingestion	8.95E-08	0.16	4.97E-07	0.32
Soil Dermal	2.35E-08	0.04	1.49E-06	0.97
JEM Vapor Intrusion inhalation	<u>3.00E-03</u>	<u>208</u>	<u>3.00E-03</u>	<u>208</u>
Total:	3.E-03	208	3.E-03	209

Notes:

JEM = Johnson-Ettinger Model

TABLE 2-3
RISK-BASED CLEANUP LEVELS - ERP SITE FT-08,
MOUNTAIN HOME AFB, IDAHO

Chemical	Soil Cleanup Level (µg/kg)	Soil Gas Cleanup Level (µg/m ³)
Benzene	70	500
Chloroform	24	170
<i>cis</i> -1,2-Dichloroethene	823	1,900
1,1-Dichloroethane	16,800	115,000
1,1-Dichloroethene	4,800	32,500
Ethylbenzene	219	1,500
Methylcyclohexane	7,030	485,000
Methylene Chloride	1,170	8,000
Naphthalene	68	111
Tetrachloroethene	93	640
Toluene	115,000	786,000
Trichloroethene	235	1,650
1,2,4-Trimethylbenzene	140	1,000
1,3,5-Trimethylbenzene	140	1,000
<i>m,p</i> -Xylene	2,340	16,200
<i>o</i> -Xylene	16,800	113,000

Notes:

µg/kg = micrograms per kilogram

µg/m³ = micrograms per cubic meter

Soil and soil gas cleanup levels were calculated from the Johnson & Ettinger model for a target risk of 1E-05 (carcinogenic) and target hazard quotient of 1 (noncarcinogenic). The lower concentration for each chemical, carcinogenic or noncarcinogenic, was selected as the chemical-specific cleanup level.

TABLE 2-4
COST ESTIMATE SUMMARY FOR THE AMENDED REMEDY - ERP SITE FT-08,
MOUNTAIN HOME AFB, IDAHO

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	COST	NOTES
Planning ²					
Submittals/Implementation Plans	1	LS	\$5,000	\$5,000	For system upgrades
Site Work ²					
Field Oversight	5	Day	\$70	\$350	Includes travel time
Trenching	500	LF	\$10	\$5,000	
Piping	500	LF	\$5	\$2,500	
Condensate Removal System	1	LS	\$2,000	\$2,000	
SUBTOTAL				\$14,850	
Contingency	25%			\$3,713	10% scope + 15% bid
Project Management ¹	8%			\$1,485	
Remedial Design ¹	12%			\$2,228	
Treatability Study ¹	10%			\$1,856	
TOTAL CAPITAL COST				\$24,131	

ANNUAL O&M COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	COST	NOTES
Site Monitoring and Maintenance					
Geoprobe Mobilization	2	LS	\$750	\$1,500	Semiannually
Geoprobe - Probe and Sample	2	Day	\$1,750	\$3,500	1 day - Semiannually
Soil Analysis ²	40	EA	\$100	\$4,000	18 samples + 2 Dups - Semiannually
Soil Gas Analysis	40	EA	\$450	\$18,000	18 samples + 2 Dups - Semiannually
URS Personnel	6	Day	\$800	\$4,800	2 travel days and 1 work day - Semiannually
Rentals and Misc	2	LS	\$290	\$580	Truck, PID, shipping, etc. - Semiannually
Data Management ²	2	LS	\$2,500	\$5,000	Analytical review and reporting - Semiannually
Monthly Maintenance	12	MO	\$2,000	\$24,000	Valves, floats, and other minor components
Non-Routine Maintenance	1	LS	\$5,000	\$5,000	Unforeseen component failure
SUBTOTAL				\$66,380	
Contingency	25%			\$16,595	10% scope + 15% bid
Project Management ¹	10%			\$8,298	
Technical Support ¹	15%			\$12,446	
TOTAL ANNUAL O&M COST				\$103,719	

PERIODIC COSTS:

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Remedial Action Completion Report ²	2	1	EA	\$15,000	\$15,000	
VE Demolition/Disposal	3	1	LS	\$27,119	\$27,119	
TOTAL PERIODIC COST					\$42,119	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (2.7%)	PRESENT VALUE	NOTES
Capital Cost	0	\$24,131	\$24,131	1.000	\$24,131	
Annual O&M Cost	1-2	\$207,438	\$103,719	0.95500	\$198,103	
Periodic Cost	2	\$15,000	\$15,000	0.948	\$14,222	
Periodic Cost	3	\$27,119	\$27,119	0.923	\$25,036	
		\$273,688			\$261,491	
TOTAL PRESENT VALUE COST					\$261,000	

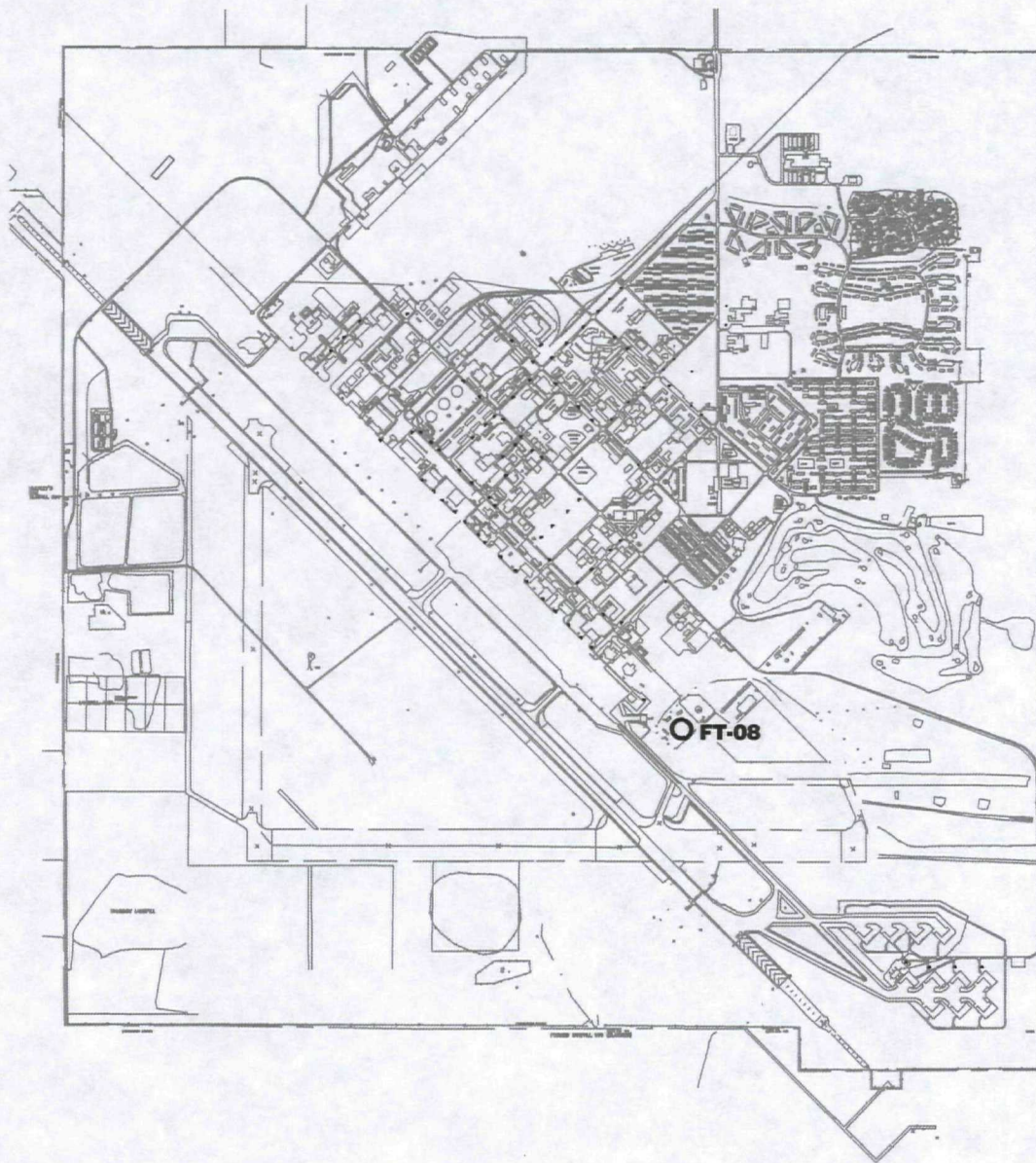
¹ = Engineering Estimates

² = Experience with similar work at similar sites

ERP SITE

FT-08

FIRE TRAINING AREA 8 (ADJACENT TO
EXISTING FIRE TRAINING AREA)



3000 1500 0 3000
SCALE IN FEET

SITE LOCATION MAP
FT-08 ROD AMENDMENT
MOUNTAIN HOME AIR FORCE BASE, IDAHO

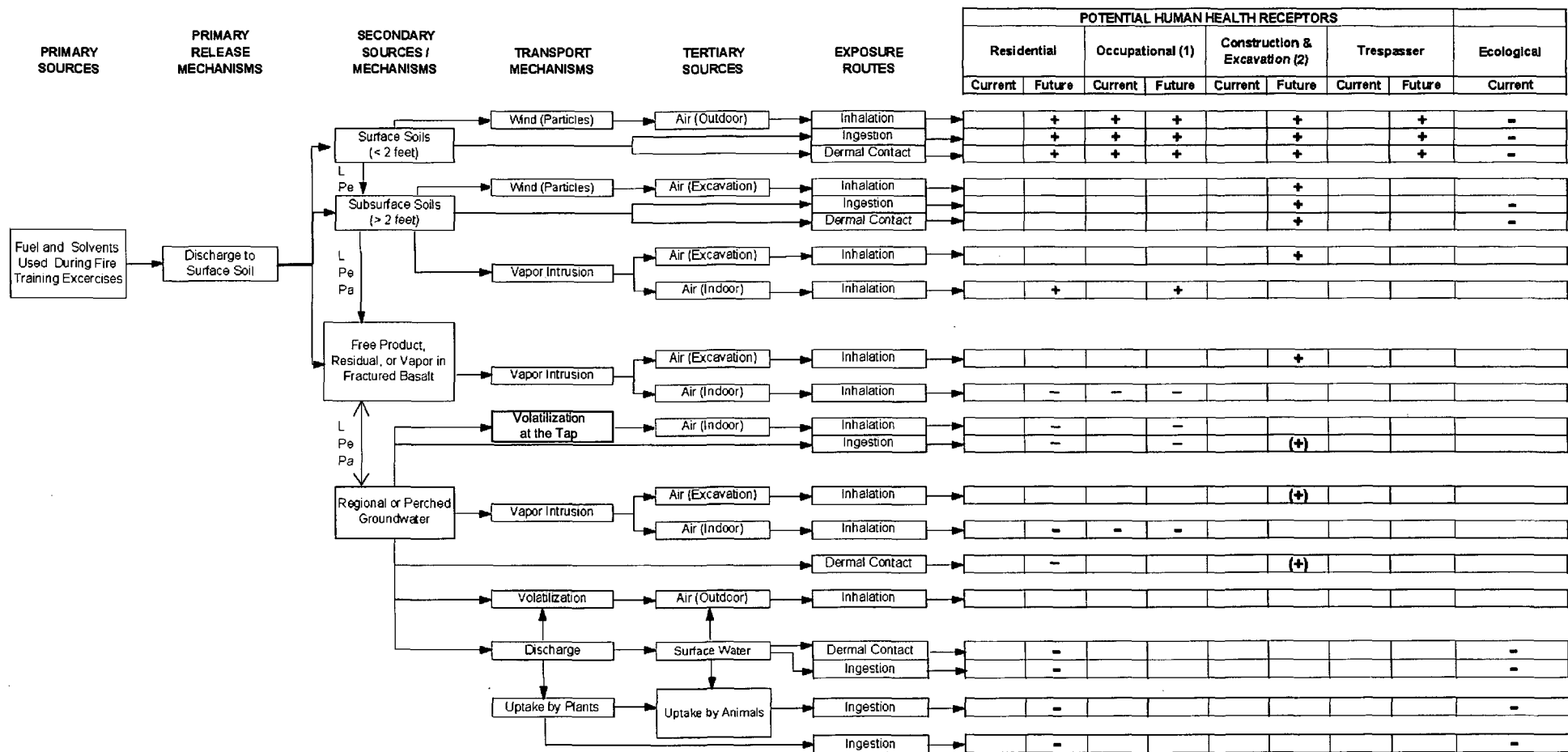
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DRN. BY: DPG	DATE: 06/09/09	PROJECT NO. 16169962	FIG. NO. 2-1
CHK'D. BY: SEM	DATE: 06/09/09		



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DRN. BY: DPG	DATE: 06/09/09	PROJECT NO. 16169962	FIG. NO. 2-2
CHK'D. BY: SEM	REVISION: 0		



Notes:

- + This route is a primary source of exposure.
- Potential but insignificant pathway

Blank There is no exposure to contaminants by this route

(+) Only if shallow groundwater is present less than 20 feet bgs.

(1) Base worker does not use irrigation/stock water and current water supply is from Base-wide water treatment facility.

(2) Exposure to shallow perched groundwater only (if present)

Mechanisms

- L Leaching
- Pe Percolation
- Pa Partitioning

Site -specific Details:

Soils were likely impacted with fuels and potentially solvents that were deposited on surface soil for fire training exercises.
Significant soil vapor concentrations have been detected in the vadose zone.

CONCEPTUAL SITE MODEL FT-08 ROD AMENDMENT MOUNTAIN HOME AIR FORCE BASE, IDAHO

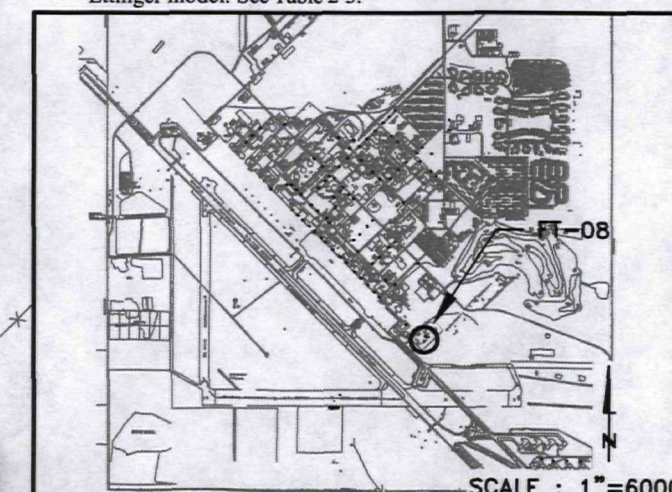
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DRN. BY: DPG	DATE: 06/09/09	PROJECT NO.	FIG. NO.
CHK'D. BY: SEM	DATE: 06/09/09	16169962	2-3

LEGEND

- ⊕ ACTIVE MONITORING WELL
- ⊖ ABANDONED MONITORING WELL
- S-2
2'-2,400 SOIL BORING WITH THE HIGHEST DETECTED TCE CONCENTRATION IN ANY SOIL SAMPLE FROM A PARTICULAR BORING, IN $\mu\text{g}/\text{kg}$.
- DM-5
3'-890
9'-250 BORING (1984) WITH SAMPLE DEPTHS AND TOX CONCENTRATIONS ($\mu\text{g}/\text{kg}$)
- 01
TCE-600
C12DCE-280 SI SOIL GAS SAMPLING LOCATION WITH ANALYTICAL RESULTS ($\mu\text{g}/\text{m}^3$) (2002)
- ⊖ SI SOIL BORING LOCATION (2002)
- ⊕ SOIL VAPOR EXTRACTION WELL (2002)
- ⊕ VACUUM PRESSURE RADIUS OF INFLUENCE TEST MONITORING WELL (2002)
- ⊖ PILOT SHALLOW EXTRACTION WELL (SEW-1 THROUGH SEW-3 INSTALLED 2006, SEW-4 THROUGH SEW-8 INSTALLED 2007)
- ⊖ PILOT BEDROCK EXTRACTION WELL (2006)
- ⊕ VACUUM PRESSURE PROBE CLUSTER - PILOT TEST (2006)
- 10,000 SOIL GAS TCE ISOCONCENTRATION CONTOUR (URS, 2003)
- TCE = TRICHLOROETHENE
C12DCE = CIS-1,2-DICHLOROETHENE
11DCA = 1,1-DICHLOROETHANE
111TCA = 1,1,1-TRICHLOROETHANE
B = BENZENE
T = TOLUENE
E = ETHYLBENZENE
X = XYLENE
TOX = TOTAL ORGANIC HALOGENS
PRG = PRELIMINARY REMEDIATION GOAL
J = ESTIMATED
 $\mu\text{g}/\text{m}^3$ = MICROGRAM PER CUBIC METER
 $\mu\text{g}/\text{kg}$ = MICROGRAM PER KILOGRAM
NA = NOT APPLICABLE

Note: Results in bold exceed the PRG calculated from the Johnson and Ettinger model. See Table 2-3.



SOIL AND SOIL GAS ANALYTICAL RESULTS SUMMARY FT-08 ROD AMENDMENT MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: DPG	DATE: 06/09/09	PROJECT NO. 16169962	FIG. NO. 2-4
CHK'D. BY: SEM	DATE: 06/09/09		

FT8-SB-04	8-feet	12-feet	PRG
VOCs ($\mu\text{g}/\text{kg}$)			
acetone	1,300	ND	NA
cis-1,2-dichloroethene	170J	440	823
benzene	ND	1,500	70
carbon disulfide	18J	36J	NA
cyclohexane	1,200	39,000	NA
ethylbenzene	730	18,000	23,400
isopropylbenzene	ND	7,100	NA
methylcyclohexane	8,300	200,000	7,030
toluene	390	34,000	115,000
trichloroethene	ND	1,300	235
xylene	9,500	200,000	19,140

BEW-1	2-feet	PRG
trichloroethene ($\mu\text{g}/\text{kg}$)	190	235
TOC (g/kg)	3.7	NA
Moisture Content (%)	16.53	NA

FT8-SB-02	8-feet	12-feet	PRG
VOCs ($\mu\text{g}/\text{kg}$)			
trichloroethene	ND	4	235

SEW-1	7-feet	PRG
trichloroethene ($\mu\text{g}/\text{kg}$)	110	235
TOC (g/kg)	0.89	NA
Moisture Content (%)	18.37	NA

FT8-SB-01	8-feet	12-feet	PRG
VOCs ($\mu\text{g}/\text{kg}$)			
trichloroethene	2J	2J	235

SEW-3	10-feet	PRG
trichloroethene ($\mu\text{g}/\text{kg}$)	ND	235
TOC (g/kg)	0.68	NA
Moisture Content (%)	7.56	NA

VPC-2	2.5-feet	PRG
trichloroethene ($\mu\text{g}/\text{kg}$)	520	235
TOC (g/kg)	3.5	NA
Moisture Content (%)	16	NA

FT8-SB-03	3-feet	12-feet	PRG
VOCs ($\mu\text{g}/\text{kg}$)			
acetone	76J	ND	NA
1,1-dichloroethene	3J	ND	16,800
cis-1,2-dichloroethene	7J	ND	823
benzene	78J	ND	70
carbon disulfide	19J	ND	NA
chloroform	29J	ND	24
cyclohexane	1,500	ND	NA
ethylbenzene	600	ND	23,400
isopropylbenzene	430	ND	NA
methylcyclohexane	6,200	7J	7,030
tetrachloroethene	28	9J	93
trichloroethene	98,000	1,000J	235
xylene	7,300	7J	19,140

SEW-2	15-feet	PRG
trichloroethene ($\mu\text{g}/\text{kg}$)	9,600	235
TOC (g/kg)	12	NA
Moisture Content (%)	17.14	NA

FT8-SB-06	3-feet	12-feet	PRG
VOCs ($\mu\text{g}/\text{kg}$)			
acetone	250J	380	NA
cis-1,2-dichloroethene	ND	36	823
cyclohexane	1,300	440	NA
ethylbenzene	490	20	23,400
isopropylbenzene	200	ND	NA
methylcyclohexane	7,100	1,100	7,030
tetrachloroethene	930	190	93
toluene	750J	110	115,000
trichloroethene	1,700	1,600	235
xylene	9,500	980	19,140
TPH ($\mu\text{g}/\text{kg}$)			
GRO	ND	34,000	NA
DRO	10,000,000	7,200,000J	NA
Waste Oil	6,800,000	4,500,000J	NA

VPC-1	12.5-feet	PRG
trichloroethene ($\mu\text{g}/\text{kg}$)	45	235
TOC (g/kg)	<2	NA
Moisture Content (%)	7.7	NA

FT8-SB-05	8-feet	12-feet	PRG
VOCs ($\mu\text{g}/\text{kg}$)			
trichloroethene	5	ND	235

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Sample Round	TCE (µg/L)
2004 Spring	NS
2004 Fall	0.98
2005 Spring	1.4
2005 Fall	1.3
2006 Spring	NS
2006 Fall	1
2007 Spring	NS
2007 Fall	0.91
2008 Spring	NS
2008 Fall	0.83

Sample Round	TCE (µg/L)
1989 Spring	1.0
1990 Spring	1.8
1991 Fall	1.3
1993 Spring	1.2

Sample Round	TCE (µg/L)
2009 Baseline	0.95
2009 Spring	1.1

Sample Round	TCE (µg/m³)	DCE (µg/m³)	BTEX (µg/m³)
VP1 (89'-96')			
2009 Baseline	1,500	33	36
2009 Spring	1,100	20	3.5
VP2 (172'-177')			
2009 Baseline	2,700	63	71
2009 Spring	1,900	15	ND
VP3 (260'-266')			
2009 Baseline	1,400	15	ND
2009 Spring	3,000	49	ND
VP4 (340'-344')			
2009 Baseline	960	4	9.3
2009 Spring	870	1.7	6.0

Sample Round	TCE (µg/m³)	DCE (µg/m³)	BTEX (µg/m³)
VP1 (77'-91')			
2004 Spring	NS	NS	NS
2004 Fall	1,916	NS	ND
2005 Spring	3,778	77	ND
2005 Fall	4,873	44	ND
2006 Spring	7,118	81	148
2006 Fall	4,709	44	ND
2007 Spring	NS	NS	NS
2007 Fall	4,380	49	ND
2008 Spring	NS	NS	NS
2008 Fall	4,216	57	ND
VP2 (171'-181')			
2004 Spring	NS	NS	NS
2004 Fall	5,420	NS	NS
2005 Spring	3,395	154	ND
2005 Fall	3,723	85	ND
2006 Spring	8,760	162	ND
2006 Fall	5,092	77	ND
2007 Spring	NS	NS	NS
2007 Fall	3,887	73	ND
2008 Spring	NS	NS	NS
2008 Fall	3,121	44	ND
VP3 (292'-301')			
2004 Spring	NS	NS	NS
2004 Fall	2,519	NS	NS
2005 Spring	1,643	5.3	ND
2005 Fall	2,300	6.5	33
2006 Spring	1,697	4.4	1.4
2006 Fall	2,354	5.3	ND
2007 Spring	NS	NS	NS
2007 Fall	2,245	6.9	ND
2008 Spring	NS	NS	NS
2008 Fall	1,752	5.3	ND

Sample Round	TCE (µg/L)
1989 Spring	1.5
1990 Spring	1.3
1991 Fall	1.3
1993 Spring	1.6
1993 Fall	1.5
1994 Spring	2.7
1995 Spring	ND(5)
1997 Spring	1.5
1998 Spring	2.5

Sample Round	TCE (µg/L)
2000 Spring	1
2000 Fall	0.99
2001 Spring	0.94
2001 Fall	0.83
2002 Spring	0.85
2002 Fall	1
2003 Spring	1.1
2003 Fall	1.2
2004 Spring	1.4
2004 Fall	1.7
2005 Spring	1.9
2005 Fall	1.7
2006 Spring	NS
2006 Fall	1.4
2007 Spring	NS
2007 Fall	1.2
2008 Spring	NS
2008 Fall	NS

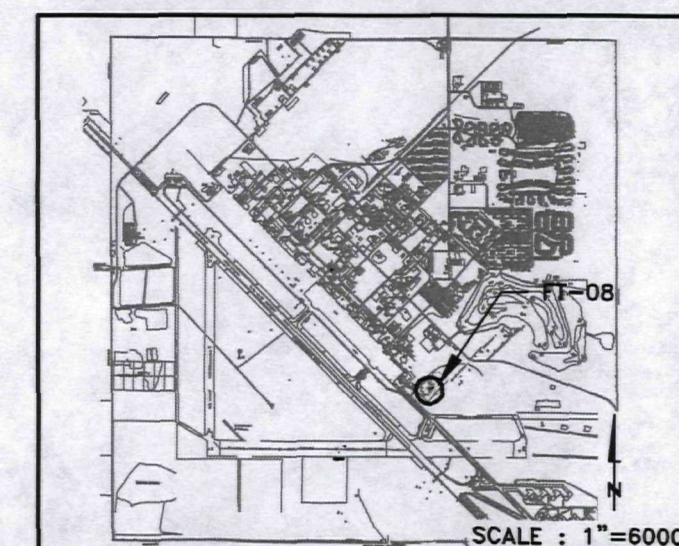
Sample Round	TCE (µg/L)
1989 Spring	Trace
1990 Spring	1.3

LEGEND

- SOIL BORING WITH THE HIGHEST DETECTED TCE CONCENTRATION IN ANY SOIL SAMPLE FROM A PARTICULAR BORING, (µg/kg)
- SOIL BORING (1984) WITH SAMPLE DEPTHS AND TOX CONCENTRATIONS (µg/kg)
- SURFACE SOIL SAMPLE (0.5-1.0 ft bgs) - WCC 1991
 - A= FT-08-001
 - B= FT-08-002
 - C= FT-08-003
 - D= FT-08-004
 - E= FT-08-005
 - F= FT-08-006

- SI SOIL GAS SAMPLING LOCATION (2002)
- SI SOIL BORING LOCATION (2002)
- VACUUM PRESSURE RADIUS OF INFLUENCE TEST MONITORING WELL (2002)
- SOIL VAPOR EXTRACTION WELL (2002)
- PILOT SHALLOW EXTRACTION WELL (SEW-1 THROUGH SEW-3 INSTALLED 2006, SEW-4 THROUGH SEW-8 INSTALLED 2007)
- PILOT BEDROCK EXTRACTION WELL (2006)
- VACUUM PRESSURE PROBE CLUSTER PILOT TEST (2006)
- ACTIVE MONITORING WELL
- ABANDONED MONITORING WELL

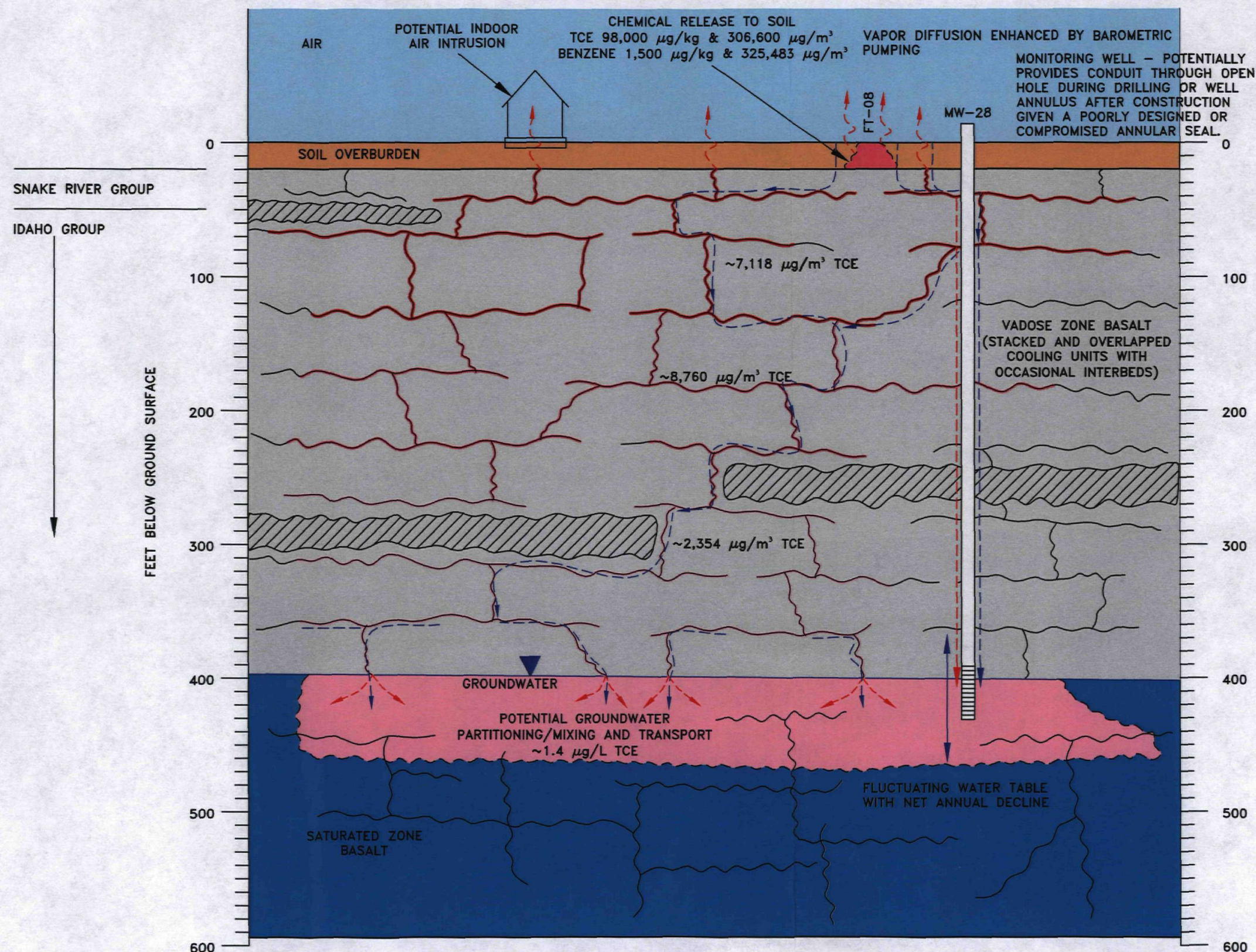
(A) = ABANDONED
 ND = NOT DETECTED
 NS = NOT SAMPLED
 (5) = REPORTING LIMIT
 µg/L = MICROGRAM PER LITER
 µg/kg = MICROGRAM PER KILOGRAM
 µg/m³ = MICROGRAM PER CUBIC METER
 TCE = TRICHLOROETHENE
 DCE = cis1,2-DICHLOROETHENE
 BTEX = BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES



LEGEND:

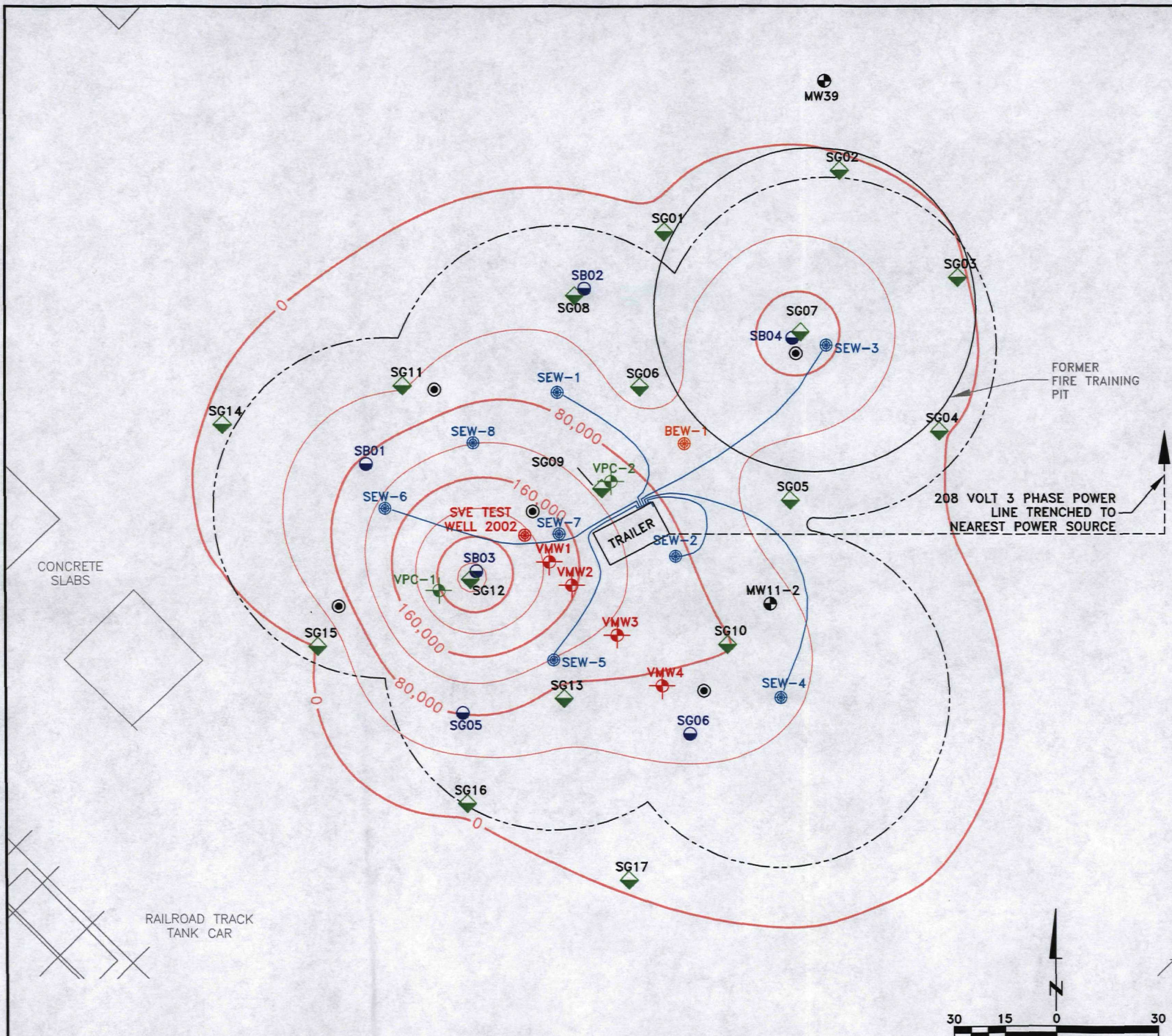
- FRACTURES IN BASALT COOLING UNITS
- POTENTIAL VAPOR TRANSPORT THROUGH FRACTURES
- POTENTIAL HISTORICAL AQUEOUS INFILTRATION OR AQUEOUS PHASE PARTITIONING
- POTENTIAL VAPOR PARTITIONING TO GROUNDWATER, OR INTRUSION INTO INDOOR AIR.
- LACUSTRINE/FLUVIAL MUDSTONE LAYERS

$\mu\text{g/L}$ = MICROGRAM PER LITER
 $\mu\text{g/kg}$ = MICROGRAM PER KILOGRAM
 $\mu\text{g/m}^3$ = MICROGRAM PER CUBIC METER
TCE = TRICHLOROETHENE

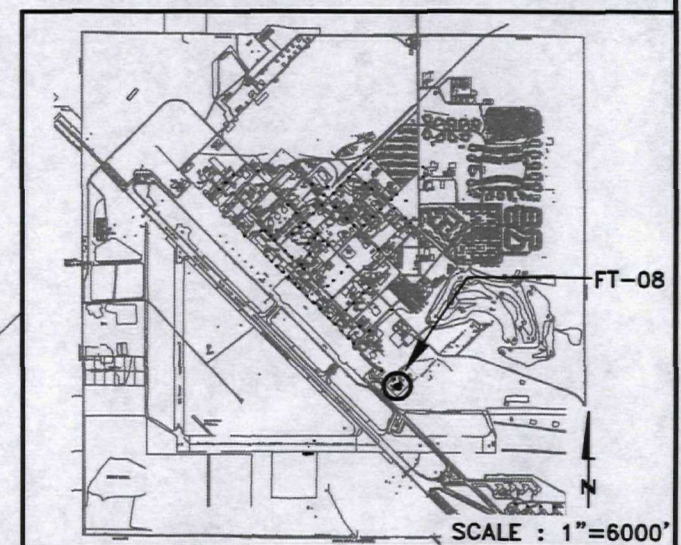


POTENTIAL ROUTES OF MIGRATION FT-08 ROD AMENDMENT MOUNTAIN HOME AIR FORCE BASE, IDAHO

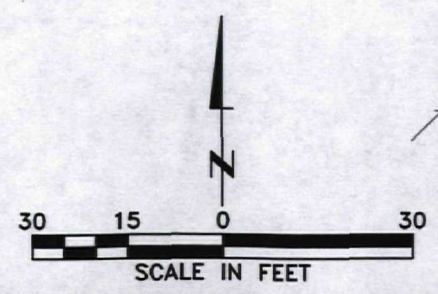
DRN. BY: DPG	DATE: 06/09/09	PROJECT NO.	FIG. NO.
CHK'D. BY: SEM	DATE: 06/09/09	16169962	2-6



- LEGEND**
- ◆ SI SOIL GAS SAMPLING LOCATION (2002)
 - SI SOIL BORING LOCATION (2002)
 - ⊕ VACUUM PRESSURE RADIUS OF INFLUENCE TEST MONITORING WELL (2002)
 - ⊙ SOIL VAPOR EXTRACTION WELL (2002)
 - PILOT SHALLOW EXTRACTION WELL (SEW-1 THROUGH SEW-3 INSTALLED 2006, SEW-4 THROUGH SEW-8 INSTALLED 2007)
 - ⊙ PILOT BEDROCK EXTRACTION WELL (2006)
 - ⊕ VACUUM PRESSURE PROBE CLUSTER PILOT TEST (2006)
 - ⊙ ACTIVE MONITORING WELL
 - ⊙ PLANNED DIRECT PUSH SOIL AND SOIL GAS SAMPLE LOCATION
 - INTERPRETED VACUUM RADIUS OF INFLUENCE FROM PILOT STUDIES
 - SOIL GAS TCE ISOCONCENTRATION CONTOUR ($\mu\text{g}/\text{m}^3$) FROM SI SAMPLING IN 2002 (URS, 2003)
 - CURRENT PILOT SVE ABOVE-GROUND PIPING
- TCE = TRICHLOROETHENE
 SI = SITE INVESTIGATION
 $\mu\text{g}/\text{m}^3$ = MICROGRAM PER CUBIC METER
 SVE = SOIL VAPOR EXTRACTION



SOIL VAPOR EXTRACTION SYSTEM CONFIGURATION FT-08 ROD AMENDMENT MOUNTAIN HOME AIR FORCE BASE, IDAHO			
DRN. BY: DPG	DATE: 07/07/09	PROJECT NO.	FIG. NO.
CHK'D. BY: SEM	DATE: 07/07/09	16169962	2-7



SECTION THREE

Responsiveness Summary

The public participation requirements set out in the NCP at 40 CFR 300.435(c)(2)(ii) have been met for ERP Site FT-08. Mountain Home AFB and EPA, with the support of DEQ, identified SVE as the amended remedy for ERP Site FT-08. No questions or comments were received in the public meeting for the Proposed Plan held on September 9, 2009. Additionally, no written comments were received during the public comment period from August 18, 2009 through September 16, 2009.

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SECTION FOUR

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TABLE A-1
SUMMARY OF CHEMICALS OF CONCERN AND MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATIONS FOR SOIL -
ERP SITE FT-08
MOUNTAIN HOME AFB, IDAHO

Scenario Timeframe: Current/Future						
Medium: Soil						
Exposure Medium: Soil						
Exposure Point	Chemical of Concern	Maximum Soil Concentration ¹	Units	Frequency of Detection	Exposure Point Concentration	Statistical Measure ²
Soil On-Site, Ingestion, Dermal Contact, and Vapor Intrusion Inhalation	Benzene	1,500	µg/kg	5/18	1,500	Max
	Chloroform	29	µg/kg	3/18	29	Max
	Ethylbenzene	200,000	µg/kg	9/18	200,000	Max
	Methylcyclohexane	200,000	µg/kg	6/12	200,000	Max
	Tetrachloroethylene	930	µg/kg	5/18	930	Max
	Toluene	34,000	µg/kg	8/18	34,000	Max
	Trichloroethene	98,000	µg/kg	14/18	98,000	Max
	1,2,4-Trimethylbenzene	26,000	µg/kg	4/6	26,000	Max
	1,3,5-Trimethylbenzene	18,000	µg/kg	4/6	18,000	Max
	<i>m,p</i> -Xylene	39,000	µg/kg	4/6	39,000	Max
	<i>o</i> -Xylene	200,000	µg/kg	4/6	200,000	Max
	Methylene Chloride	2,400	µg/kg	1/33	2,400	Max

Notes:

µg/kg = micrograms per kilogram

(1) Maximum detected concentration from site-specific sampling.

(2) Maximum concentrations, instead of statistically-derived values, of contaminants of concern from the entire historical site analytical data set were used as exposure point concentrations in order to provide a conservative approach.

TABLE A-2
SUMMARY OF CHEMICALS OF CONCERN AND MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATIONS
FOR SOIL GAS - ERP SITE FT-08
MOUNTAIN HOME AFB, IDAHO

Scenario Timeframe: Current/Future						
Medium: Soil						
Exposure Medium: Soil Gas						
Exposure Point	Chemical of Concern	Maximum Soil Gas Concentration ¹	Units	Frequency of Detection	Exposure Point Concentration	Statistical Measure ²
Soil Gas On-Site, Vapor Intrusion Inhalation	Benzene	325,733	µg/m ³	2/17	325,733	Max
	Chloroform	1,460	µg/m ³	4/17	1,460	Max
	<i>cis</i> -1,2-Dichloroethene	1,520	µg/m ³	5/17	1,520	Max
	1,1-Dichloroethane	84,000	µg/m ³	2/17	84,000	Max
	1,1-Dichloroethene	1,200	µg/m ³	1/17	1,200	Max
	Ethylbenzene	3,870	µg/m ³	1/17	3,870	Max
	Toluene	40,741	µg/m ³	3/17	40,741	Max
	Trichloroethene	306,011	µg/m ³	16/17	306,011	Max
	<i>o</i> -Xylene	123,894	µg/m ³	2/17	123,894	Max

Notes:

µg/m³ = micrograms per cubic meter

(1) Maximum detected concentration from site-specific sampling.

(2) Maximum concentrations, instead of statistically-derived values, of contaminants of concern from the entire historical site analytical data set were used as exposure point concentrations in order to provide a conservative approach.

TABLE A-3
CANCER TOXICITY VALUES - ERP SITE FT-08
MOUNTAIN HOME AFB, IDAHO

Pathway: Ingestion, Dermal						
Chemical of Potential Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence/Cancer Guideline Description	Source	Date
Benzene	5.5E-02	5.5E-02	(mg/kg-day) ⁻¹	A	IRIS	2008
Chloroform	6.1E-03	6.1E-03	(mg/kg-day) ⁻¹	B2	IRIS	1999
cis -1,2-dichloroethene	—	—	—	D	—	—
1,1-dichloroethane	—	—	—	C	—	—
1,1-dichloroethene	—	—	—	C	—	—
Ethylbenzene	—	—	—	D	—	—
Methylcyclohexane	—	—	—	—	—	—
Methylene chloride	7.5E-03	7.5E-03	(mg/kg-day) ⁻¹	B2	IRIS	2008
Tetrachloroethene	5.2E-02	5.2E-02	(mg/kg-day) ⁻¹	—	NCEA	2003
Toluene	—	—	—	—	—	—
Trichloroethene	1.3E-02	1.3E-02	(mg/kg-day) ⁻¹	—	Cal EPA	2008
1,2,4-trimethylbenzene	—	—	—	—	—	—
1,3,5-trimethylbenzene	—	—	—	—	—	—
m,p-xylenes	—	—	—	—	—	—
o-xylene	—	—	—	—	—	—

TABLE A-3
CANCER TOXICITY VALUES - ERP SITE FT-08
MOUNTAIN HOME AFB, IDAHO

Pathway: Inhalation							
Chemical of Potential Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Units	Weight of Evidence/Cancer Guideline Description	Source	Date
Benzene	2.2E-06	$\mu\text{g}/\text{m}^3$	2.7E-02	$(\text{mg}/\text{kg}\cdot\text{day})^{-1}$	A	IRIS	2008
Chloroform	2.3E-05	$\mu\text{g}/\text{m}^3$	8.1E-02	$(\text{mg}/\text{kg}\cdot\text{day})^{-1}$	B2	IRIS	1999
cis -1,2-dichloroethene	—	—	—	—	D	—	—
1,1-dichloroethane	—	—	—	—	C	—	—
1,1-dichloroethene	—	—	—	—	C	—	—
Ethylbenzene	—	—	—	—	D	—	—
Methylcyclohexane	—	—	—	—	—	—	—
Methylene chloride	4.7E-07	$\mu\text{g}/\text{m}^3$	1.6E-03	$(\text{mg}/\text{kg}\cdot\text{day})^{-1}$	B2	IRIS	2008
Tetrachloroethene	5.9E-06	$\mu\text{g}/\text{m}^3$	1.2E-02	$(\text{mg}/\text{kg}\cdot\text{day})^{-1}$	—	IRIS	2008
Toluene	—	—	—	—	—	—	—
Trichloroethene	2.0E-06	$\mu\text{g}/\text{m}^3$	1.3E-02	$(\text{mg}/\text{kg}\cdot\text{day})^{-1}$	—	Cal EPA	2008
1,2,4-trimethylbenzene	—	—	—	—	—	—	—
1,3,5-trimethylbenzene	—	—	—	—	—	—	—
m,p-xylenes	—	—	—	—	—	—	—
o-xylene	—	—	—	—	—	—	—

Notes:

— = Not Applicable

Cal EPA = California Environmental Protection Agency

IRIS = Integrated Risk Information System (online database)

NCEA = National Center for Exposure Assessment

mg/kg-day = milligrams per kilogram per day

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

Weight of Evidence:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

TABLE A-4
NON-CANCER TOXICITY VALUES - ERP SITE FT-08
MOUNTAIN HOME AFB, IDAHO

Pathway: Ingestion, Dermal								
Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Source of RfD and/or Target Organ	Dates of RfD and Target Organ
Benzene	Chronic	3.0E-03	mg/kg-day	3.0E-03	mg/kg-day	Bone Marrow	IRIS	2008
Chloroform	Chronic	1.0E-02	mg/kg-day	1.0E-02	mg/kg-day	Liver/Kidney	IRIS	1991
cis -1,2-dichloroethene	Chronic	1.0E-02	mg/kg-day	1.0E-02	mg/kg-day	Blood	PPRTV	2008
1,1-dichloroethane	Chronic	1.0E-01	mg/kg-day	1.0E-01	mg/kg-day	Kidney/CNS	HEAST	1997
1,1-dichloroethene	Chronic	5.0E-02	mg/kg-day	5.0E-02	mg/kg-day	Liver	IRIS	1991
Ethylbenzene	Chronic	1.0E-01	mg/kg-day	1.0E-01	mg/kg-day	Liver/Kidney	IRIS	1991
Methylcyclohexane	Chronic	8.6E-01	mg/kg-day	8.6E-01	mg/kg-day	—	HEAST	1997
Methylene chloride	Chronic	6.0E-02	mg/kg-day	6.0E-02	mg/kg-day	Liver	IRIS	1991
Tetrachloroethene	Chronic	1.0E-02	mg/kg-day	1.0E-02	mg/kg-day	Liver	IRIS	2008
Toluene	Chronic	2.0E-01	mg/kg-day	2.0E-01	mg/kg-day	Liver/Kidney	IRIS	2008
Trichloroethene	Chronic	3.0E-04	mg/kg-day	3.0E-04	mg/kg-day	Nervous System	Provisional	2008
1,2,4-trimethylbenzene	Chronic	5.0E-02	mg/kg-day	5.0E-02	mg/kg-day	—	PPRTV	2008
1,3,5-trimethylbenzene	Chronic	5.0E-02	mg/kg-day	5.0E-02	mg/kg-day	—	PPRTV	2008
m,p-xylenes	Chronic	2.0E+00	mg/kg-day	2.0E+00	mg/kg-day	—	IRIS	2008
o-xylene	Chronic	2.0E+00	mg/kg-day	2.0E+00	mg/kg-day	—	IRIS	2008

TABLE A-4
NON-CANCER TOXICITY VALUES - ERP SITE FT-08
MOUNTAIN HOME AFB, IDAHO

Pathway: Inhalation								
Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC	Inhalation RfC Units	Inhalation RfD	Inhalation RfD Units	Primary Target Organ	Source RfC and/or Target Organ	Dates of RfD and Target Organ
Benzene	—	3.0E-02	mg/m ³	1.7E-03	mg/kg-day	Blood	IRIS	2008
Chloroform	—	9.8E-02	mg/m ³	8.6E-05	mg/kg-day	Liver/Kidney	IRIS	1991
cis-1,2-dichloroethene	—	—	—	1.0E-02	mg/kg-day	—	—	—
1,1-dichloroethane	—	—	—	1.4E-01	mg/kg-day	Kidney	HEAST	1997
1,1-dichloroethene	—	2.0E-01	mg/m ³	5.7E-02	mg/kg-day	Liver	IRIS	1991
Ethylbenzene	—	1.0E+00	mg/m ³	2.9E-01	mg/kg-day	Liver/Kidney	IRIS	1991
Methylcyclohexane	—	—	—	8.6E-01	mg/kg-day	—	—	—
Methylene chloride	—	1.1E+00	mg/m ³	8.6E-01	mg/kg-day	Liver	IRIS	1991
Tetrachloroethene	—	2.7E-01	mg/m ³	1.1E-01	mg/kg-day	—	IRIS	2008
Toluene	—	5.0E+00	mg/m ³	1.1E-01	mg/kg-day	Liver/Kidney	IRIS	2008
Trichloroethene	—	1.0E-02	mg/m ³	1.1E-02	mg/kg-day	Nervous System	NYS DOH	2008
1,2,4-trimethylbenzene	—	7.0E-03	mg/m ³	1.7E-03	mg/kg-day	Blood	PPRTV	2008
1,3,5-trimethylbenzene	—	6.0E-03	mg/m ³	1.7E-03	mg/kg-day	—	PPRTV	2008
m,p-xylenes	—	7.0E-01	mg/m ³	2.0E-01	mg/kg-day	—	IRIS	2008
o-xylene	—	7.0E-01	mg/m ³	2.0E-01	mg/kg-day	—	IRIS	2008

Notes:

— = Not Applicable

Cal EPA = California Environmental Protection Agency

CNS = central nervous system

HEAST = Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System (online database)

mg/kg-day = milligrams per kilogram per day

mg/m³ = milligrams per cubic meter

NYS DOH = New York State Department of Health

PPRTV = Provisional Peer Reviewed Toxicity Values

RfC = reference concentration

RfD = reference dose

TABLE A-5
RISK CHARACTERIZATION SUMMARY
REASONABLE MAXIMUM EXPOSURE INHALATION RISK BY COMPOUND -
ERP SITE FT-08
MOUNTAIN HOME AFB, IDAHO

Chemical of Potential Concern	Occupational				On-Site Resident			
	Soil Gas		Soil		Soil Gas		Soil	
	Risk	HI	Risk	HI	Risk	HI	Risk	HI
1,2,4-Trimethylbenzene				160				190
1,3,5-Trimethylbenzene				18				21
1,1-Dichloroethane								0.00018
cis-1,2-Dichloroethene		0.19		0.46		0.28		0.56
Ethylbenzene		0.72		2.8		1		3.4
m,p-Xylene				14				17
Methylcyclohexane				0.085				0.1
o-Xylene		0.78		4.1		1.1		5
1,1-Dichloroethene		0.03				0.38		
Toluene								0.31
Benzene	4.02E-03	48.14	1.50E-04	1.82	7.00E-03	70	2.23E-04	2.22
Chloroform	5.30E-05		8.70E-06		9.30E-05		1.30E-05	
Methylene chloride			1.50E-05	0.029			2.15E-05	0.04
Trichloroethene	9.68E-04	2.26	2.60E-03	5.96	1.60E-03	3.1	3.74E-03	7.26
Tetrachloroethene			7.20E-05	0.056			1.05E-04	0.07
Total	5.E-03	53	3.E-03	208	9.E-03	76	4.E-03	247

Notes:

HI = Hazard Index

1. Johnson and Ettinger Model was used to obtain values presented in table.
2. Risks based on all collected site data

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TABLE B-1
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS - ERP SITE FT-08
MOUNTAIN HOME AFB, IDAHO

Regulation / Citation	ARAR Type			Description
	Action	Chemical	Location	
I. Air				
A. Federal				
National Primary and Secondary Ambient Air Quality Standards (NAAQS)	X	X		Establishes ambient air quality standards for emissions of chemicals and particulate matter and establishes requirements for control of fugitive dust and particulate emissions. Applicable if remedial activities result in any of these emissions.
40 Code of Federal Regulations (CFR) Part 50	X	X		Applicable. Emissions of particulates and chemicals that occur during remedial activities will meet the applicable NAAQS.
National Emission Standards for Hazardous Air Pollutants 40 CFR Part 61		X		Establishes emission standards for certain industrial pollutants and sources. Relevant and appropriate.
Threshold Limit Values (TLVs) Established by American Conference of Governmental Industrial Hygienists (ACGIH)		X		Applicable if there is a release of airborne contaminants during remedial activities. TLVs are based on the time-weighted average (TWA) exposure to an airborne contaminant over an 8-hour work day or a 40-hour work week. Identify levels of airborne contaminants with which health risks may be associated.
B. State				
Air Pollution Control Rules Idaho Administrative Procedures Act (IDAPA) 58.01.01	X			Applicable for minimizing airborne contaminants. Remedial activities will be designed to take all reasonable precautions to prevent particulate matter from becoming airborne and may include the use of water or chemicals as dust suppressants, the covering of trucks, and the prompt removal and handling of excavated materials.
Ambient Air Quality Standards IDAPA 58.01.01.577	X	X		Establish ambient air quality standards for particulate matter, lead, and other constituents. Acceptable ambient concentrations (AACs) for carcinogens and noncarcinogens are provided as 24-hour averages. Ambient air quality standards for particulates and lead are provided as annual and 24-hour averages. Applicable.
Toxic Air Pollutants IDAPA 58.01.01, 585 and 586		X		Applicable and provides screening emission levels and AACs for carcinogens and non-carcinogens. Release of carcinogenic and non-carcinogenic contaminants must be estimated before start of construction, controlled if needed, and monitored during excavation and sorting of soil. Best Available Control Technology (BACT) required if emissions exceed AACs.

**APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS - ERP SITE FT-08
MOUNTAIN HOME AFB, IDAHO**

Regulation / Citation	ARAR Type			Description
	Action	Chemical	Location	
II. Water				
A. Federal				
National Primary Drinking Water Standards 40 CFR Part 141, 142	X	X		Establishes maximum contaminant levels (MCLs) for specific contaminants which are health-based standards for public drinking water systems. Relevant and appropriate.
National Secondary Drinking Water Standards 40 CFR Part 143		X		Establishes secondary maximum contaminant levels (SMCLs) which are nonenforceable guidelines for public drinking water systems to protect the aesthetic quality of the water. Relevant and appropriate.
Maximum Contaminant Level Goals (MCLGs) PL No. 99-339, 100 Stat. 642; 40 CFR 141,142		X		Establishes drinking water quality goals at a level at which no adverse health effects may occur with an adequate margin of safety. Relevant and appropriate.
Wellhead Protection Program 42 USCA 300h-7			X	Directs states to implement protection programs for wells and recharge areas for drinking water. Relevant and appropriate.
B. State				
Idaho Drinking Water Regulations Idaho Administrative Procedures Act (IDAPA 58.01.08.050)		X		Applicable for potential impacts to regional groundwater. Regulation of drinking water quality. Requires that contaminant concentrations in drinking water remain below MCLs and non-zero MCLs and MCLGs. By final rule effective February 22, 2002, United States Environmental Protection Agency (USEPA) lowered the MCL for arsenic from 0.05 mg/L to 0.01 mg/L (66 FR 7061)
Protection of Surface and Groundwater Idaho Non-Point Source Management Plan (December 1999)	X			Applicable for possible non-point discharges to surface or groundwater. Remedial activities will be consistent with the state's goal of restoration, maintenance, and protection of the beneficial uses of both surface water and groundwater. Long-term goals include design and implementation of best management practices for surface water and groundwater.
II.B.1. Groundwater				
A. Federal				
Groundwater Monitoring CFR 264, Subpart F; 40 CFR 264, Subpart X	X			Established standards for detection and compliance monitoring. Site-wide monitoring will accommodate specific groundwater monitoring requirements. Applicable.
B. State				
Groundwater Quality Rule IDAPA 58.01.11		X		Establishes minimum requirements for the protection of groundwater through groundwater quality standards that are largely identical to MCLs and Secondary MCLs. Applicable.
Groundwater Quality Rule IDAPA 58.01.11.200		X		Provides for numeric groundwater quality standards based on protection of human health and asthetic qualities. Establishes primary and secondary constituent standards for the protection of groundwater. Applicable.

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MOUNTAIN HOME AFB, IDAHO

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III. Siting, Design and Management of Facilities				
A. Federal				
Fault Areas 40 CFR 264.18(a)			X	New facilities where treatment, storage or disposal of hazardous waste will be conducted is prohibited within 61 meters (200 feet) of a fault displaced in Holocene time. Relevant and appropriate.
Endangered Species Act 16 USC Sect. 1531 et seq.; 50 CFR 200; 50 CFR 402			X	Protects endangered species, threatened species, and preserves their habitat. Applicable.
Bald Eagle Protection Act 16 USC Sect. 688 et seq.			X	Protects all eagle species and restricts activities that may threaten or adversely affect their habitat. While the bald eagle was removed from the federal list of threatened and endangered species, this Act prohibits anyone without a permit from "taking" bald eagles, including their parts, nests, or eggs. Applicable.
Migratory Bird Treaty Act 16 USC Sect. 703 et seq.			X	Protects migratory, resident, or range habitat of migratory birds including raptors and waterfowl. Applicable.
The Historic and Archaeological Data Preservation Act of 1974 16 USC Sect. 469 et seq.; 40 CFR 6.301©			X	Establishes procedures to provide for preservation of historical and archaeological data which might be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity program. Applicable if culturally significant artifacts are found during site excavation.
The Archaeological Resource Protection Act of 1979 16 USC Sect. 470aa-47011 et seq.			X	Requires a permit for any excavation or removal of archaeological resources from public or Indian lands. Applicable if culturally significant artifacts are found during site excavation.
Native American Graves Protection and Repatriation Act PL 101-601			X	Requires that if Native American remains or cultural items are found on federal lands, the appropriate tribe must be notified, and all activity in the area of discovery must cease for at least 30 days. Applicable if culturally significant artifacts are found during site excavation.
Antiquities Act of 1906 16 USCA 431-433; 43 CFR Part 3			X	Provides for protection of historic and prehistoric ruins and objects on Federal lands. Applicable if culturally significant artifacts are found during site excavation.
Occupational Safety and Health Standards 29 CFR Part 1910	X			Establishes safety and health requirements for personnel working with hazardous materials and hazardous waste. Applicable.
Safety and Health Regulations for Construction 29 CFR Part 1926	X			Establishes protection standards (e.g., hazard communication, excavation and trenching requirements) for workers involved in hazardous waste operations. Applicable.

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B. State				
Idaho Land Remediation Rules IDAPA 58.01.18.027	X			Applicable for containing residual contamination. These provisions describe a range of institutional controls, including legal use restrictions that may be available in certain situations. Institutional controls may be part of voluntary remediation under specified circumstances. Institutional controls may be needed in instances where residual concentrations of chemicals remain in excess of risk or regulatory levels in order to reduce or eliminate contact with contaminated media.
IV. Fish and Wildlife				
A. Federal				
Fish and Wildlife Conservation Act of 1980 16 USC 2901; 50 CFR Part 83			X	Applicable if activity affected wildlife and non-game fish. Federal departments and agencies required to use their statutory and administrative authority to conserve and promote conservation of non-game fish and wildlife and their habitats. Non-game fish and wildlife are defined as fish and wildlife that are not taken for food or sport, that are not endangered or threatened, and that are not domesticated.
Endangered Species Act 16 USC 1531 et seq; 50 CFR Parts 17, 401, 402; 40 CFR 6.302 (b)			X	Determination of presence of endangered or threatened species. Unlawful to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any federally-designated threatened or endangered species.
				Protects endangered or threatened species and their habitat. If endangered or threatened species are in the vicinity of remediation work, USFWS must be consulted and the remediation activities must be designed to conserve endangered or threatened species and habitats. Applicable if any endangered species are present on site.
Migratory Bird Treaty Act (MBTA) 16 USC 703 et seq.			X	Protect migratory birds by avoiding taking or killing of protected species. Unlawful to "hunt, take, capture, kill" or take various other actions adversely affecting a broad range of migratory birds, including tundra swans, hawks, falcons, songbirds, without prior approval by the USFWS. The mortality of migratory birds due to ingestion of contaminated sediment is not a permitted take under the MBTA. Applicable if any migrating birds are affected.
Responsibilities of Federal Agencies to Protect Migratory Birds Executive Order 13186			X	Conservation of migratory birds. Encourages federal agencies to integrate migratory bird conservation principles into agency plans and activities. Such efforts may include preventing or abating pollution for the benefit of migratory birds or restoring or designing migratory bird habitat. Applicable if any migrating birds are affected.

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B. State				
Endangered Species IC Section 36-201	X			Determination of presence of endangered or threatened species. Remediation will be designed to conserve endangered or threatened species, and their habitat. Applicable if any endangered species are present on site.
Classification and Protection of Wildlife Idaho Statute 36-201 and IDAPA 13.01.06	X			For the protection of wildlife. The Idaho Department of Fish and Game classifies wildlife as game; protected non-game and threatend or endangered species; and unprotected and predatory wildlife. Species of special concern, threatened, or endangered species may not be taken or possessed, except as provided by Idaho Fish and Game. Applicable if any endangered species are present on site.
V. Cultural Resources				
A. Federal				
Archaeological and Historic Preservation Act 16 USC 469, et. seq., 40 CFR 6.301 (c)			X	Establishes procedures for preservation of historical and archaeological data that might be destroyed through alteration of terrain as a result of federal construction project or a federally licensed activity or program. Presence or absence of such data on the site must be verified. If historical or archaeological artifacts are present in remediation areas, the remedial actions must be designed to minimize adverse effects on the artifacts. Applicable if culturally significant artifacts are found during site excavation.
Archaeological Resources Protection Act 16 USC 470aa et seq.; 43 CFR Part 7			X	For historic properties or landmarks within areas of the site that may contain historical and archaeological data, prohibits the disturbance or removal of archaeological resources on public and Indian lands without a permit. Requires that an archaeological investigation must be conducted by a professional archaeologist. Federal agencies must identify possible effects of proposed remedial activities on historic properties (cultural resources). Steps must be taken to protect archaeological resources and sites that are on public and Indian lands. Investigators of archaeological sites are to be identified. Applicable if culturally significant artifacts are found during site excavation.
National Historic Preservation Act 16 USC 470 et seq; 36 CFR Parts 60, 61, 63, 65, and 800; 40 CFR 6.301(b); and Executive Order 11593			X	Identify and minimize possible adverse effects of proposed remedial activities on historic properties. Federal agencies must identify possible effects of proposed remedial activities on historic properties (cultural resources). If historic properties or landmarks eligible for, or included in, the National Register of Historic Places exist within remediation areas, remediation activities must be designed to minimized the effect on such properties or landmarks. If potential adverse effect is identified, an evaluation of alternatives to "avoid, minimize, or mitigate" the impact, in consultation with the State Historic Preservation Office. Unavoidable impacts on historic sites or structures may be mitigated through such means as taking photographs and collecting historical records. Applicable if culturally significant artifacts are found during site excavation.

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Native American Graves Protection and Repatriation Act 25 USC 3001 et seq; 43 CFR 10			X	To protect Native American burial sites and funerary objects. Implementing regulations are intended to protect Native American graves from desecration through the removal and trafficking of human remains and “cultural items” including funerary and sacred objects. Regulations require that if such items are inadvertently discovered during excavation, the excavation must cease and the affiliated tribes must be notified and consulted. Applicable if culturally significant artifacts are found during site excavation.
American Indian Religious Freedom Act 42 USC 1996 et seq.			X	Protects religious, ceremonial, and burial sites and the free practice of religions by Native American groups. If sacred sites are discovered in the course of soil disturbances, work will be stopped and the Native American Tribe will be contacted. Applicable if culturally significant artifacts are found during site excavation.
B. State				
Preservation of Historic Sites Idaho Statute 67-4601 et seq. and Idaho Statute 674101 et seq.	X		X	Applicable if property within areas of the Site contain historical and archaeological data. Covers historical sites and historical districts within the State of Idaho and the excavation of archaeological resources. The State Historical Society publishes the National Register of Historic Places for Idaho.